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ABSTRACT

This state-of-the-art series is the third of four interdependent monographs under the umbrella title of Education and Socioeconomic Development. Educational indicators are emphasized as part of the social indicators being considered in various countries. This monograph includes a glossary on understanding the language of education and related terms, and a chapter on the case for education in socioeconomic development. The core of the monograph reviews the approaches to educational indicator work in the following nine agencies: (1) Bureau of School Programs Evaluation, the State Department of Education, U.S.A.; (2) Institute for Educational Research, Finland; (3) National Center for Education Statistics, U.S.A.; (4) Organization for Economic Co-Operation and Development, France; (5) Office of Management and Budget, U.S.A.; (6) Stanford Research Institute, U.S.A.; (7) Urban Institute, U.S.A.; (8) United Nations Economic and Social Council, Switzerland; and (9) United Nations Economic, Scientific and Cultural Organization, France. A special chapter is devoted to the work of two agencies on output or result indicators, i.e. the International Association for the Evaluation of Educational Achievement, Stockholm, Sweden, and the National Assessment of Educational Progress, Denver, Colorado. (Author/RL)

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MONOGRAPH

EDUCATIONAL INDICATORS OF DEVELOPMENT

1978

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EDUCATION AND SOCIOECONOMIC DEVELOPMENT

MONOGRAPH III:
EDUCATIONAL INDICATORS OF DEVELOPMENT

1978

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ACKNOWLEDGEMENTS

The idea of a study of social indicators as they relate to social and economic development arose through discussions held in the early 1970s at meetings of the Canadian Council on Rural Development. The initial purpose was to prepare a state-of-the-art report on social indicator work. The scope of social indicator work proved to be so broad that during the exploratory phase of the project it was decided to emphasize "educational indicators" as one of the many social indicators being considered in various countries.

The initial documentation was prepared in unpublished report form during the 1973-74 period. Since a majority of the programs considered at that time were in progress, it appeared valuable to follow the work through 1976, by which date most of the work would have entered a stage of completion.

The initial project was undertaken with the support and encouragement of the University of Saskatchewan, the Canada Council, and the Department of Regional Economic Expansion. The later phase was supported, and publication was made possible, by the Extension Division, University of Saskatchewan.

Special appreciation is extended to the United Nations Research Institute for Social Development (UNRISD), Geneva, Switzerland, and the Department of Educational Studies, University of Edinburgh, Scotland, for providing me with a "working base" for a five-month period spent in each location. The counsel, encouragement, and hospitality offered by colleagues there were particularly helpful.

The compilation of information and experience involved contact with many individuals and agencies in numerous countries, and I should like to express my thanks to those who so willingly responded with information, references and reactions.

I wish to thank all those who cooperated and assisted in preparing the manuscript, especially Jean Knowles and Bert Wolfe for editing and Irene Dyck, Collene Fuglerud and Kathy Tunnicliffe for typing, and Angèle Brown for coordinating the secretarial work involved.

It should be noted that although several Canadian researchers and their projects are referred to in this series, no attempt has been made to encompass all Canadian work.

Readers are invited to send along their criticisms and suggestions.

Harold R. Baker

IV

The Content of the Monograph Series

The results of this study of social and educational indicators of development have been published in a series of monographs under the umbrella title of Education and Socioeconomic Development. While the four monographs are interdependent, each is intended to be useful by itself. Their content is as follows:

Monograph I An International Overview of Work on Social Indicators and the Requirements of a Social Indicator System

Includes a summary of the work reviewed in the Monograph Series, an introduction to social indicators giving their origins, importance and uses, an overview of work on social indicators in 18 selected countries, and an outline of the requirements of a social indicator system, including a conceptual framework, suggested organization in a Canadian context, and recommendations for the establishment of a system, with emphasis at the subnational (provincial/local) levels.

Monograph II: Social Indicators of Development

Includes a glossary on understanding the language of development, quality of life and social indicators, and other related terms. The core of the monograph is a review of the approaches to social indicator work in four international organizations, followed by some conclusions on the work.

Monograph III: Educational Indicators of Development

Includes a glossary on understanding the language of education and related terms, and a chapter on the case for education in socioeconomic development. The core of the monograph is a review of the approaches to social indicator work in nine agencies. A special chapter is devoted to the work of two agencies on output or result indicators -- The International Association for the Evaluation of Educational Achievement and The U.S. National Assessment of Educational Progress. The Monograph ends with some conclusions on educational indicators.

Monograph IV: A Selected Annotated Bibliography Concerned with Learning; Its Nature, Trends, and Measurement*

An extensive annotated bibliography of publications concerned with learning. The work contains over 500 entries under the headings: general readings on society and its development, quality of life, social indicators, general education, post-education, lifelong learning, educational indicators, and a bibliography of bibliographies.

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* Publication pending

Preface

Most people are familiar with economic indicators such as the number of people employed or the per capita disposable income. Yet another economic indicator is the Consumer Price Index. The Index provides us with an accurate picture of how much a given and fixed quantity of goods and services has changed in cost over time. Combined with other information, the Index can indicate whether we are better off now compared to the past in terms of our level of living.

Social scientists assume that social progress or "development" can be measured as well, using social indicators. Take for example one of our most pervasive social institutions: education. Many indicators of the adequacy of the educational enterprise have been suggested. These include the student-teacher ratio, physical accessibility to educational institutions, the performance of graduates in specific skills areas -- the list goes on and on.

For any single social "area of concern" such as education, there are therefore many possible indicators. As we shall see, much of the work in the social indicator field involves reducing the number of indicators to save time and expense in gathering information and compiling statistics. For example, say that it is established that the performance of the graduates from technical schools in specific skill areas is directly dependent on the student-teacher ratio. Assuming that this relationship can be proved, or "validated," there is little point in evaluating the performance of graduates -- a time-consuming and expensive process -- to determine the quality of a given educational system.

In determining which indicators of social development to use, researchers may employ what are called simulation models. These are attempts to duplicate "on the drawing board" and in a highly simplified manner the workings of a particular element of the social system. To return to our example, such a model for education would include many variables in addition to those already mentioned -- level of education of teachers, social and economic status of students, physical conditions of the learning environment, availability and use of educational resources and so on. The researchers attempt to establish the relationship between the variables in their theoretical models and then to predict what will happen if these variables are changed. In this way they identify which variables appear to have the greatest impact on the quality of education and hence which variables to use as measures or indicators of education. The approach has the advantage of reducing the need for empirical surveys to determine the validity of indicators. But the indicators chosen by the "model" method are only as accurate as the models themselves; and particular models are always open to criticism in terms of the degree to which they accurately reflect "real life."

Most social indicator programs provide for a basic 3-step plan of attack. First, decide what it is that you want to measure. This usually involves determining policy goals in the area of social development and expressing these goals in terms of specific outcomes. Second, arrive at the indicators which you are going to use -- the most time-consuming and controversial part of the process. And third, collect the relevant data. As you read the description of social indicator activities in various countries, you will realize that these basic steps are frequently modified. In some cases, social indicator work has consisted primarily of collecting statistics. Many countries now periodically publish "social reports" that include data on such topics as health and personal social services, education, housing, environment, justice, and working conditions. There is also an increasing trend towards accumulating "subjective data" on people's attitudes towards themselves and their expectations and values. The information thus assembled is intended to help describe the "quality of life" of those surveyed.

In the maze of statistics, technical terms and organizational charts it is easy to lose sight of the basic goal of all social indicator programs. Their purpose of course is to measure and monitor the rate of social progress or regression. It is hoped that governments would use indicators to determine their policies and programs, and to evaluate their effects, and if necessary change policies and programs to steer a different course. The ideal social indicator system would allow policy-makers to pinpoint the cause of a particular social setback such as a decrease in the language or mathematics skills of citizens. In this way a "dashboard reading" can be taken of a region or a society. But this ideal has yet to be reached. It is not simply a matter of lack of agreement among the experts concerning the methodology of identifying social indicators. Governments themselves have yet to recognize the importance of a national system of social accounts. Government policies tend to support programs that have an immediate economic payoff and obvious benefits to the taxpayer. Quite clearly, social indicator work does not always fall into this category;

it involves an expensive and long-term commitment by government, with "low profile" results that cannot be presented simply in terms of dollars and cents. For a government to inform its citizens that the "quality of life" in the country has improved is not nearly as effective as a passing reference to lower unemployment rates or a higher Gross National Product (GNP). Along with progress in social indicator methods, there must therefore also be greater recognition of the importance of social values.

MONOGRAPH III:
EDUCATION AND SOCIOECONOMIC DEVELOPMENT

Educational Indicators of Development

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Chapter I

A GLOSSARY ON UNDERSTANDING THE LANGUAGE

As noted in Monograph II, a review of the literature in the social indicator field reveals that there is a semantic and conceptual problem of considerable proportion. Thus in that document a glossary was provided relating to "development," and "quality of life and social indicators."

In the field of education there is a similar, though perhaps better known, problem of terminology and meaning. The recently published "International Standard Classification of Education" by the United Nations should aid in easing this difficulty in the future. However, for our purposes here, it is perhaps helpful to refer to terms and definitions drawn upon in this series, in the hope that these will aid in the communication of the material.

1. Education and Related Terms

There is no universal definition of education, or of its various qualifications. In fact, there is sufficient confusion in terminology and related concepts that a concerted attempt is currently being made to document standardized lists of definitions and the content of the data related to them. It follows that there is no universal definition for the "educated man," although it appears to be possible and useful to specify what and how education might contribute to man's development within a specific context; environment, family, community, culture, society.

In recent years the temptation has become stronger to differentiate between education and learning, primarily because education has become so closely tied conceptually by both the public and by educators to mean the compulsory, formal system(s). Learning is now used by many to connote a more positive concept, since it focusses attention on the "ends" rather than on the "means" of the educational process, i.e., the individual learner.

This is not the place to define all terms which modify the concept of education, and which have been given detailed attention in international classification by ISCED (see Appendix I), e.g., direct (face-to-face), indirect (distant), correspondence, radio/television, university (extra-mural), university (extension), public, animation, community, social, fundamental, adult basic, workers', trade union, liberal, technical and vocational education. However, for purposes of this study, the clarification of certain terms, commonly used or emerging, is important.

Education is perceived as "organized and sustained instruction designed to communicate a combination of knowledge, skills and understanding valuable for all the activities of life." More briefly, it is "organized communication designed to bring about learning" (1). It has also been defined as "an explicated component of level of living" (2), and "the exchange of knowledge and human talent" (3). The latter definition has the advantage of encompassing the emerging concept which views the teacher-student relationship as one of "partnership" in the learning process. Education refers to learning when it is not used to describe the educational system and its administrative and structural aspects. But the question remains open: Is competence the criterion or the ideal? Is education a means or an end in itself?

Learning is "any change in behaviour, information, knowledge, understanding, attitudes, skills or capability which can be ascribed to growth or to the development of inherited (instinctive) behaviour patterns" (1).

The learning force is the total number of people developing their capacities through systematic education; that is, where learning is aided by teaching and there are formal, organized efforts to impart knowledge through instruction" (4). (Author's note: to avoid confusion with "formal education," as defined later, it may be desirable to avoid the word "formal" in the preceding definition.)

Organized instruction is intended to mean programs "consisting of prearranged courses with established aims or curricula." Sustained instruction is intended to mean that "the learning experience has the elements of duration and continuity" (1).

Communication may be defined as "the transfer of information (messages) from one person to another or others" (1). Human communication is "a relationship between two or more persons involving the transfer of information (messages) by the transmission of stimuli (signals) and the evocation of responses" (1).

Formal education is that learning which takes place in "the hierarchically structured, chronically graded education system, running from primary school through the university and including, in addition to general academic studies, a variety of specialized programs and institutions for full-time technical and professional training" (5). Another definition suggests that "education is considered formal if persons are registered or at least enrolled as students in an educational activity" (1).

Adult education, as a concept, provides a good deal of confusion in communication, both at the international and national levels; no doubt because of the wide variety of circumstances and practices which characterize it. Some adult educators distinguish carefully between adult education (in its agency concept) and the education of adults (in its learning concept). One definition states that adult education "is that which takes place after the initial experience of education has been interrupted, either by participation in the labor market or engaging in some other non-educational activity." It is also organized programs of education "provided for the benefit of and adapted to the needs of persons not in the regular school and university system and generally older than fifteen " (1). ISCED thus gives the full definition of adult education as "communication planned in a pattern or sequence, with explicit or implicit aims, involving the transfer of information, knowledge, understanding, attitudes, skills or capability, provided for the benefit and adapted to the needs of persons not enrolled in regular school, college or university education and generally older than fifteen" (1). This definition is frequently used as applying also to the concept of out-of-school education.

Formal adult education is "adult education for which students are enrolled" (1) or registered. Nonformal adult education is "adult education for which students are not enrolled" (1) or registered.

These terms can readily become confused in the literature which speaks of either nonformal or informal education, leaving out the word "adult" but perhaps assuming the involvement of adults, either exclusively or primarily. Traditionally, such terms may have assumed adult participation exclusively, but with the current concept of lifelong education this may not be so. Nonformal education may be defined as "skill and knowledge generation which takes place outside the system of formal, graded schooling" (7). However, this definition does not distinguish between education which is not in the formal system and yet is planned in the sense that it has agreed upon learning objectives and education in which learning takes place more by chance. Considering this dilemma, a more acceptable definition of nonformal education is "any organized educational activity outside the established formal system--whether operating separately or as an important feature of some broader activity --that is intended to serve identifiable learning clientele and learning objectives" (5). This leaves it possible to define informal education as "the truly lifelong process whereby every individual acquires attitudes, values, skills and knowledge from daily experience and the educative influences and resources in his or her environment--from family and neighbors, from work and play, from the market place, the library and the mass media" (5).

In recent years three other terms have come into common usage for which various definitions may be found: continuing education, recurrent education and post-compulsory education. Continuing education may be defined as "the education, both vocational and non-vocational, of those whose main occupational role is no longer that of a student" (8). It implies continuous learning in some form, without any connotation of, for example, rotations between working, playing and learning. On the other hand, recurrent education implies "a new pattern of educational opportunities which affect the structure of the basic educational system" (9) and may be seen by some as inferring more than other related terms. For example, "recurrent" for some will mean intermittent periods in which learning will be emphasized (a kind of "sabbatical" connotation); for others it will mean a "refreshing, renewing, upgrading or relearning of some area of knowledge once mastered," and in that context may not have the message of "personal growth" held by continuing education. Post-compulsory education is a term of recent origin used largely at the international level, convenient due to the varying terminal compulsory ages for schooling in various nations. The term is clear in that it includes all voluntary education after the compulsory time ends for each individual in each country, and it thus implies the inclusion of all nonformal, continuing and recurrent education of the post-compulsory period. It seems less clear whether or not the term should include learning through the daily experience of "informal education" as defined above.

Lifelong education (synonyms, "permanent" or "integrated") is a term of particular importance to this study (see Chapter II). Lifelong education is only in its conceptual stage. Its importance stems from two related factors; first, the importance of youthful, preparation-for-life learning is now the emphasis of the formal system of education, and second, the increasing (and perhaps now parallel) importance of the continuous learning required to cope with the rapid adjustments, adaptations and changes required in a post-industrial society. It seems useful to define lifelong education as "the whole span of deliberate education at all ages . . . viewed as an integral whole" (8). Its importance lies in seeing each sector of education within the larger whole--each being influenced and shaped by the sectors which precede and follow it (for a visual conceptualization of lifelong education see Appendix II). Our dilemma is that "for nine persons out of ten education means school, an activity of a particular nature expressed in terms of curricula, methods and specialized staff--a world apart which can only be described in an epithet peculiar to itself, 'scholastic'."

The more formal education will be carried out through the educational system, "a system which has as one of its main tasks the transformation of various information into knowledge and culture" (the qualitative problem of comprehensive general and vocational education) (1). But the learning required for the future, perhaps inside the educational system (as yet largely compulsory) and outside of it (now and in the future, largely voluntary) will have to take into account new types of learning, such as: self-directed learning, which is "learning organized by the learner in which no educational agency or teacher is consciously involved"; and random learning, which is "learning from stimuli from the environment (e.g., experiences and acts of random or socially determined communication) that are not purposefully organized by an educational-providing agency or teacher or by the learner" (much like the above idea of informal education) (1). In any educational program concerned with development or with equality of access or opportunity, these concepts will be of increasing importance as we recognize the importance of environment (family, community, mass media, etc.) to the shaping of minds, a role viewed in recent decades by the educational system and a bulk of the public as being attributable largely to the efforts of the formal educational system.

In concluding the definitional and conceptual discussion on education, it may be useful to clarify other related terms used in the literature. From the point of view of "manpower," the concept of stocks (human or educational) relates to "that data referring to states or circumstances of a population" (12)--the educational levels attained by age, sex, ethnic origin or other categories useful to analysis. Human flows is "that data referring to changes in states or circumstances" (12) of a population. Most manpower considerations deal with vocational and professional education, which can be defined generally under career education as "the development of knowledge and of special and general competencies in individuals and groups to help them interact with the economic sector in a manner that will ensure satisfactory economic and psychological incomes from employment" (13). This definition is more comprehensive than some in that it includes the concept of psychological income. However, this also adds to the difficulty of measurement. The term then becomes close to the idea of human resource development in its humanistic concept, which includes social, psycho-social and cultural elements along with those elements in the instrumental concept of human resource development, which includes skills, abilities and attitudes as they contribute to economic growth, productivity and efficiency (12).

Of importance also are terms associated with concepts of educational levels, distribution, and so on. Although we have implied difficulty in defining the "educated man," development analysis is helping us clarify what it is to be uneducated: "to not possess the necessary minimum capacities for clearing oneself from the work tasks and social tasks imposed by the modern system of production" (at the individual level). At the society level (undereducation of one social group or strata), to be uneducated is the "underrealization of the productive and social potentials created by the advancement of production forces," e.g., in science (11). Those individuals or groups fitting this definition could be said to be educationally deprived and in a state of disequality.

Equality is perceived in two primary contexts: equality of access and equality of opportunity. In equality of access, the system has a stated policy which provides "open access" to those who can meet the specified standards; frequently, however, various situations, e.g., geographic isolation, family circumstances, make equality of opportunity more limited to the individual(s) involved than would the stated or implied "equality of access." One definition of equality of school opportunity which could be enlarged to make a conceptual start on the equality issue is "enough places, a wide range of acceptable alternatives, or assured second places" (14).

A conceptual point important in any concrete consideration of equality and the role and impact of the educational system on individuals and groups has to do with defining the characteristics of the learners which are important to learning; ascribed characteristics being those characteristics over which the individual has no, or little, control or influence, e.g., race, class, sex, and achieved characteristics being those over which the individual has considerable, or potential control or influence, e.g., position, income, power, education (11). In socioeconomic terms advantaged groups and regional populations have considerable control or influence, disadvantaged groups and regional populations have only potential control or influence.

The current debate on education and equality seems increasingly to relate educational planning, opportunity, access, etc., to the characteristics laid down by the educational system. Ability may be viewed as "shorthand for a complex of factors which can only with great difficulty be seen to have a common denominator" (15), and which relates to mental, verbal, manual, creative--all different kinds of ability, drawing on personality and personal characteristics. Achievement or attainment levels can only be defined in specific terms in relation to standards and goals; achievement being defined in terms of norms or teachers' standards--with the difference between prior achievement and final achievement considered to be growth (16), and attainment levels being "a qualitative ordering of possible sets of conditions" (17). Further, the term granular composition has been used as "the unit of measurement for differentiation by which knowledge and skills are distributed in practice (in schools and in out-of-school education), and on the strength of whose accuracy decisions concerning education are made" (18). Such measurement thus becomes important in relating education to ascribed and achieved characteristics of learners and in relating formal and nonformal education to informal (environmental) education.

Finally, the educational change required and assumed in today's developmental and change context must submit to innovation. Educational innovation is "a change in education--in aims, content, structure, and methods--tried out for the first time in a particular environment." To be successful, point of entry must be identified; these are "points in the formal and nonformal education system which offer readiness for innovation toward desired vectors and which have potential leverage for diffusion of successful experiments" (19).

Several other concepts may be useful in thinking about education for social and economic development.

Functional Information has been used by the IEA* to "avoid the use of the word 'knowledge' which has many shades of meaning that require close definition and in order to make room for certain practical abilities needed for the acquisition of scientific information." Comprehension was taken as "the ability (of the student) to use his knowledge in familiar situations, in other words, in the context in which it is required." Application was taken as "the ability of the student to select appropriate knowledge and apply it in a novel situation" (20).

In dealing with literacy programs, Friere invented a large number of conceptual terms. Their use depends somewhat on the stage of development involved. However, they are still mind-stretching. He speaks of the literacy phase in which education seeks out and investigates the "generative word" (in relation to real life), and the post-literacy phase in which education seeks out and investigates the "generative theme." His "themes" might be perceived as "social concerns" at the individual or group level in literacy programs, and in later stages in action (in transforming unjust reality). He gives great importance to dialogue in the context of education, perceiving it as "the encounter of men addressed to the common task of learning and acting" (21).

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*International Association for the Evaluation of Educational Achievement.

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Chapter II

A CASE FOR EDUCATION

1. Its Role in Development

An examination of the varied concepts of development quickly reveals why there is difficulty in any population reaching quick agreement on the objectives of education--what role it should perform. The issue is even more critical today, when there is such uncertainty about the concept of linear economic growth, leading to another perplexing question for some, "Is the traditional concept of growth (production-economic) to be equated with development?"

There appears little doubt that this is an issue associated with value trends over recent decades which have led to a perception of growth in terms of "science and technology feeding economic enterprise." However, a growing number of intellectual and political leaders appear to be questioning this restricted definition of development, supported by education critics who argue that the educational system has simply followed the value trends of society and fed the "economic machine." This, they argue, has tended to undermine the social fabric of societies and led, unintentionally perhaps, to social unrest in a wide range of circumstances in both the "less developed" and "more developed" societies.

Underlying certain discussions in today's literature is an implicit assumption that the educational system bears a major share of responsibility for the social unrest, or that it offers a potential remedy for it, or both (in the sense that reform could improve social well-being even if in the past it has inadequately done so). Counterarguments suggest that the linkage between education and development is sufficiently unclear that there is no valid reason for thinking that education can be very influential in correcting social ills (including social unrest, but also a wide range of more specific ills such as employment, poverty, mental illness, crime). At the root of this argument is a growing perception, based on research, that such difficulties are founded more in the nature of the society than in its educational system. The educational system is made to reflect the values of the society, and to a large degree its freedoms to teach, e.g., in the social realm, are restricted by those values. Some would argue further that democratic societies are increasingly unclear or uncertain in articulating dominant values, and thus the educational system has tended more toward the preparation of youth for subsequent work roles in the economic system. The strengthening of minorities, the recognition of weaknesses in past values, etc., have helped support such tendencies. If one follows the argument further, while some feel relative disintegration of the family has forced the schools to take over discipline and the inculcation of values, there are those who feel neither home nor school is performing these functions adequately; thus lack of discipline and uncertain values have become general weaknesses in modern society.

It seems unlikely that these varying points of view can be easily reconciled. They may, however, lead toward a more healthy consideration of the real role of education in development. Since none of them is without some basis of validity in viewing selected segments of most democratic societies, they cannot and should not be ignored.

The very existence of these varying points of view makes it all the more essential that in discussing educational reforms the concepts and assumptions be made clear. With this need in mind, the case for education in relation to development is discussed in this monograph on the following basis:

1. Education is to be taken as the influence of learning on the capability of individuals and groups to respond effectively to the problems and opportunities of their environment (physical, economic, social, political and cultural). Since the environment is perceived in a dynamic context, in fact as rapidly changing, learning is to be seen in the context of lifelong education, including the learning opportunity contributed by both the formal system (variously termed the educational enterprise or educational industry) and the nonformal system (where learning is outside the regular school-university graded system but is assisted by educational planners and teachers). The concept does not include informal education defined as learning from day-to-day living.

2. Development is to be taken as the balanced* process of social and economic (socioeconomic) progress or improvement which is based on the values and aspirations, and ultimately the policies and objectives, of a specific group of people in a specific geographic area. It is neither economic development alone nor social development alone, but recognizes their mutual importance to societal development and the essential art of acting upon them as a unified whole.

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*"Unified" development may also be used to suggest the type of development envisaged. The term "integrated" development is avoided only because of the political sensitivity of that term through its use in interracial discussions.

While these statements are intended to help clarify the basis for discussion, such broad definition does not make the discussion of education in relation to development easier than if the relationship were to be discussed in terms of, for example, manpower for economic growth. Rather, the discussion becomes more complicated and difficult. However, the assumption is that future demands on educational policy and planning make it essential to take the broader view. This assumption becomes obvious in examining current attempts to assess the role of education or to develop educational indicators.

Within this framework, there is first the question of what education contributes to economic development. There appears to be universal agreement that it does contribute in important ways and, therefore, since economic development is now an accepted (though questioned) societal goal, education for economic development is a fundamental concern of government policy. Toward a Social Report states that:

> "Knowledge, intellectual skills and the creative capacity of scientists and artists are an important part of the Nation's wealth. Health, national defence, and the quality of the environment in the future years depend on the success of research and education now. So does the future performance of the economy. Some studies have suggested that as much as one-fourth of our growth in per capita income can be traced to increased schooling and as much as one-third to inventions and 'advances in knowledge.' The decisive productive potential of the supply of knowledge is illustrated by the surprisingly rapid recovery of the German and Japanese economies after the devastation of World War II. However much physical capital has been destroyed, the stock of useful knowledge remained."

There is less agreement on the blend of education (in terms of levels and types) required to sustain or increase economic development. The proportion of public investment to allocate to preschool, elementary, secondary, post-secondary (formal and nonformal) education and to literacy is a policy issue for every nation and region. There seems to be some concensus that the answer lies, not in some predetermined principle, but perhaps more in the stage of development* involved.

To date, it has not been possible to determine the quantitative effect on economic production of a given educational increment. We only have some judgmental ideas, based on empirical evidence that certain factors influence economic production. The idea of manpower policy is to bring "human resources" into closer correspondence with the needs associated with development policy. This "pull" effect on the part of public policy has been supported by the "push" effect of the consumers of education (parents) seeking to improve the rewards and status of their children. The cycle was complete when a large portion of the rewards came to be perceived as the products of economic production itself, resulting in our present "consumer" society. Educational planners appear to have little influence in changing this dynamic and forceful cycle.

Thus, there are those who suggest that ultimately there may be a lack of student interest in educational content, since their prime motive is to gain the rewards and status. Indeed, this may be at the root of much of the unrest in recent years in scholastic institutions. In the end there is "the emergence of growing numbers of 'educated unemployed.' Rather than contributing to economic growth, the system ultimately may feed on itself, i.e., graduates have to be employed by the educational system in order to obtain employment, while the masses of the population get disproportionately small benefits."

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*Stage of development refers here to the various points on the continuum of development from agrarian society through to urbanization and industrialization. However, a comprehensive definition would also take social resource development into account.

There is, of course, a wide range of literature on manpower planning and human resource development to meet the demands of employment for economic growth. It has represented one of the major schools of thought which predominate in the literature over the last two or three decades. Two approaches are taken to such study: one attempts to estimate the rate of return on educational investment for employment; the other tries to forecast manpower needs. The first approach is frustrated by what is sometimes termed the "psychic" benefits and external effects which represent social rather than economic forces. The second approach of forecasting tends to be favored as increasing proportions of graduates are employed in the public sector where predictions seem more reliable than in the purely private sector.

While education for economic growth has been a primary emphasis in recent decades, what education contributes to social development is a question of growing importance to most societies. This is another school of thought which mainly represents an important aspect of the "private" demand for education. Where knowledge and skill have been the supporters of economic development, attitudes, values, and social relationships have come under increasing discussion as the undergirders of social development. Not only are there the questions, "What values should be taught?" "How can they best be taught?" and "Can they be measured?" but also "When, where, and by whom should they be taught?"

The premise of any discussion on development should not avoid or discredit social development, as it relates to human resources for economic development, either in terms of increasing GNP or increasing personal income. Most employers in the business world these days are themselves concerned with the social aspects of organizational development, as well as the economic.

The major issue appears to be getting social development in balance with economic development. To achieve the balance, the strong and weak points in both the economic and social domains must be determined, and greater investment directed to the weak areas. We readily know, for example, when there has been a bloody revolution, or when employees protest, or when pollution reduces a lifespan, that something is out of tune or imbalanced. The growing concern is centered around how major decision-making centers can alleviate social distress while permitting continuing economic growth. There is a minority plea for questioning economic growth in favor of putting social well-being first, even by slowing down growth (if necessary to "zero"). The "futures" researchers argue such consideration from the point of view of our limited resources for the increasing world populations; the "quality of life" researchers appear to argue the point more in terms of benefits to social well-being.

The role of education in social development can then be viewed as having several functions. The formal system may face an increasing responsibility in teaching values, attitudes and social relationships. Some would argue that these areas were being taught indirectly through the curriculum in earlier years and were largely abandoned with the emergence of the "permissive society"; that the "permissive society" developed because too little attention was paid to updating the values and attitudes that were assumed by new generations; and that the task now is to develop a set appropriate for contemporary living and to teach them. Such propositions, of course, are complex for several reasons; for example, it is suggested that even if the educational system is superseded "as the informing element in our society," it is too powerful to disappear--it is now training teachers who will be retiring in the year 2018. And Professor Bertaux reminds us "there is no reason *a priori* why a teacher should teach anything other than what he has learnt, or in any other way than that in which it was taught to him. This is an important cause of 'hysteresis' (delayed effect); therefore the definition of time in educational reform is the generation, i.e., about 25-30 years" (3). While there is apparent growing pressure from various sectors of society that social development should be given more attention through the early years of the formal system, one cannot with confidence interpret current trends in curriculum planning as an effort to emphasize this aspect. As yet, schools and their supporting bodies appear to be preoccupied with teaching, finding out whether they have taught and, more recently, teaching how to learn. Certain innovations in achieving this latter goal may hold some promise of influencing social development more than before. However, there is also the argument from conventional educators that innovation and experimentation may represent a root cause of certain failures in the educational system, and there is currently an unresolved tension between the old and the new.

One of the traditional arguments regarding the social development of children has been that where it is needed to compensate for deprivation there is need to provide remedial programs for the parents as well. Certain programs in recent years, based partly around the concept of the "community" school," have emphasized this need. Research now provides substantial evidence that school achievement is correlated with socioeconomic status of families, and that this influence is sufficiently strong to predetermine at an early stage whether children will cope with school. In Education in the Year 2000, Torsten Husen writes that, "according to a renewed analysis of earlier research findings, made by Professor Benjamin Bloom of Chicago University (Bloom, 1964) at least two thirds of the individual differences in intellectual capacity found at the age of 18 could already be portended when the pupils started at the age of 6. In other words: the greater part of the intellectual differentiation, irrespective of whether this is essentially conditioned by heredity or environment, is already there when the pupil starts to school." The strong influence of the social environment on educational performance is supported by Hayward, who suggests that education could play a key role in social development, especially in an area of profound significance--that of "psychic underdevelopment." He argues that even adults carry childlike tendencies which can be taught and learned. The character traits and behaviour such as obsessionalism and excessive aggression appear in children as incomplete development and growth. In adults these same traits may be termed "psychic infantilism" or "psychic underdevelopment." For example, if a child throws a temper tantrum it is appropriate because it is considered a "stage" in his growth and development, but if a grown man does it, such behavior is considered inappropriate for his age. However, similar behavior may be observed which has come to be accepted and which may or may not enhance development and social well-being. The grown man may strive to enlarge his million dollars to 100 million just as the child may contrive to keep all the lollipops to himself. "Mature people in their psychic lives show usually a high propensity to enjoy wide variations of playfulness or a regress to gain the emotional energy of earlier instinctual reactions when this is useful." The author asserts that "What is commonly accepted as a 'mature' person in modern society is confused with many attributes such as biological growth, social position, function in the economy and conventional behavior in society's institutions. Or, it may be confused with some static state like the position of 'settling in' to a middle age of closed minds and routines rather than a mature capacity for dynamic change and personal growth. What we are concerned with here is to take note of that aspect of development which contributes the fundamental psychic content to all other behavior." While Hayward does not suggest that educational systems should be solely responsible for transforming the psychic development of people, he does conclude that their role could be a key one. He suggests, therefore, that social and educational policy today and for the future cannot do less than face a new direction, and that "this [psychic underdevelopment] could constitute what might be the essential inquiry for the future of education..."

The "areas of social concern," as determined through an adequate social process (involving the population or its representatives) within a social system, should be designed to reflect what role education should and can play in socioeconomic development.

A major difficulty results in the recognition that apart from the "area of concern" of education itself, there is an educational function associated with most if not all other areas of concern. Therefore, indicators and statistics, as well as educational planning, will have to take this fact into account. To deal with education alone as an autonomous entity is to ignore its vital relationship with other components of the social system. Educational indicators of development must represent a complex of factors, related both directly and indirectly to education itself. Yet there is a tendency in model building, and therefore in indicator development, to ignore this fact, and to treat education as "the educational industry in a preparation-for-life exercise" rather than as learning for the enhancement of social well-being, with effective performance in the economic domain as an essential supporting reality. In the context of "the enhancement of social well-being" education has a role in areas of concern such as urbanization, environment, housing, participation and alienation, etc., and more study is needed to determine the extent of its present and potential influence in these domains. An exception to these areas where education now plays a limited role has been its relation to social mobility and employment. This emphasis reflects the tendency of researchers and politicians to view the educational system primarily as one providing occupational and status selection (a mechanism of stratification).

Education's function of stratification is another topic under debate today, at a time in which allocation to a "layer" of society is not designated by birth as it was in the past. In this context education "re-channels talent" in the society. With this in mind, Galtung suggests that "it may not be so important that people on top of society are so brilliant, or that brilliant people have relevant knowledge, but it does seem important that people with development-relevant knowledge also are in a position where that knowledge can be implemented." There would appear to be little disagreement with this view in any industrialized society; there may be less agreement on the extent of the stratification caused by the educational enterprise; if not in economic development, then certainly in social development.

In considering the well-being of the individual, as opposed to the group (society), the extent of stratification becomes an important issue for future educational policy. The reason it is an issue is the growing recognition that one function of education, in its comprehensive form, is that it has served to open up the channels of dissent, and short-term policy reaction to this phenomenon may have important ramifications for long-term socioeconomic development. Indeed, the policy reaction to dissent will reflect governmental assumptions about the nature and purpose of development, and the role of education in relation to it.

The role of education in development cannot be defined in precise terms during changing times except in a specific context in a specific time period. It must therefore be subject to continuous study, evaluation and reform. Each responsible policy body will have to decide to the best of its ability what role (functions) it wants education to play and what policies may best support the performance of that role. One choice may be to achieve higher levels of homogeneity in the society by inculcating national values, and another may be to encourage diversity of values and thus heterogeneity. Education may be seen as tied to economic development, in the short run to liberate parents for productive work, in the long run to sustain or add to the educational stock; or it may be designed for its indirect benefits to health or other features of social well-being.

In the context of development in disadvantaged regions or countries, it would be unjust and contrary to the facts to ignore the contributions made by education. Just as educational activity, led by either external or internal sources, has helped developing countries to gradually achieve relative independence, so can such activity help the disadvantaged areas within a country. Genuine development will not occur by simply transplanting from external sources projects based on economic incentives. Where there is educational enlightenment, strong initiative from the people within the region is essential. Strategies which combine social and economic development from within the region concerned become the essence of developmental planning. These strategies cannot be carried on effectively without serious consideration of education and learning.

2. Lifelong Education as an Imperative for Socioeconomic Development

Lifelong education is already an imperative; to society and to society's maintenance and development. There is ample evidence of this in the observations and studies in both developing and industrialized countries. There is limited evidence, but encouraging signals, that it is being recognized by at least parts of the educational sector.

The early implementation of a policy of lifelong education is an imperative for two primary and related reasons: first, it is necessary to relieve and supplement the increasing burdens and expectations being imposed on the formal educational system.* And second, in times of rapid material and social change, it is necessary to help people to adapt to societal change, to maintain relative self-autonomy and independence, and to contribute to general development.

In the listing of national goals proposed by the Science Council of Canada, two "elements" of the goals for education are proposed:

- Opportunities for education of high quality, at all levels from elementary through to post-doctorate and including all forms of post-secondary training, should be available to all Canadians, to the limit of their individual abilities;
- opportunities should be available for upgrading the education of adults, to assist those who have been bypassed in their youth and to allow others to keep pace with the advances in their specialized fields.

These proposals go a long way toward recognition of the importance of lifelong education. However, there is in them an implied preoccupation with human resource development for science and technology within an economic framework. Left in some uncertainty is the role for education in socioeconomic development in the breadth required in today's society. The importance of education for social development is not clear.

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*UNESCO estimates that in the "More Developed Regions" (MDR), the total number of pupils in all age ranges per 1,000 persons in the labor force will rise from 475 in 1965 to 487 in 1975 and 504 by 1980. ("Educational Development, World and Regional Statistical Trends and Projections until 1985," UNESCO, Paris, mimeo COM/WS/363, January 1974. Background paper prepared for the World Population Conference, Bucharest, August 19-30, 1974.)

A principal recommendation in the UNESCO International Commission's Report is the adoption of the concept of lifelong education, involving all age levels and extending beyond formal schooling into all activities which have a potential to contribute to learning. In reviewing education as development, Platt suggests that the implementation of this recommendation would mean "linking education more closely to life, to work and to solving community problems." He feels this linkage is simply the rediscovery of powerful earlier precepts: Plutarch of ancient Greece said, "The City is the best teacher"; Pestalozzi (1746-1827) said, "Every part of the background, natural or man-made--the home, the school, the community--participates in the educative task." Platt's view is that innovations are needed "which explore on a wide-scale basis the vectors of change which hold promise of major improvements in equality of opportunity, relevance, and affectiveness to cost; tinkering with existing highly wasteful systems will not be sufficient. Educational planning at the turning point thus becomes largely the planning and management of large-scale innovation. While this does not mean de-schooling as advocated by some, it will mean structural rearrangements in education."

There are many such arguments in support of lifelong education for social and economic development. However, the critical issue one finds in the literature is the question of what to do with the present formal institutionalized system of education which, as stated elsewhere in this monograph series, currently has a stranglehold on the resources and role-status selection of individuals in most countries.

The supporters and critics of the formal system appear to represent all strata of the system itself; learners, teachers, parents, administrators, politicians, and so on. Thus there is naturally a debate over its viability. Few would argue that a great deal of thought should be given to any major shifts. However, there are those who feel that the major thought being given to educational change is being given outside the system itself, for example, by leading student and international organizations, and that the policy directions of the educational system, by its own accord, have changed little the "youth" and "classroom" orientation which has traditionally characterized it. Given the strength of the formal system (in numbers, status and finances), and a public now largely separated from its administration, two alternative futures for lifelong education seem most likely.

The first would involve the strengthening of programs for the education of adults, perceived in the context of "education for change, development and self-actualization"; the second would be a slower, incremental change in which external pressures would influence the formal system to adopt the concept of lifelong education and become involved in policies and be program-active with all ages.

There are arguments commonly presented by those who feel that the formal system should remain a "preparation for life" and scholastic endeavor, and that education at the adult level should be left adrift and

and largely to voluntary action. One is based on an assumption that the adult has the responsibility, the ability and the opportunity to continue learning independent of any public support or encouragement; another combines a set of related assumptions involving the separation of learning and work, appropriate and inappropriate ages for learning in the formal system, a fear of the "real world" interfering in the formal learning enterprise, and perhaps most potent, a disbelief that there is currently a growing demand for learning through the formal system at adult age levels. While young people are readily seen as learners, adults tend to be seen as non-learners.

Moreover, rapidly shifting economies, e.g., rural to urban or vice versa, and changing career patterns within modern industry, e.g., manual to automation, make educational planning in the formal system increasingly difficult, if not impossible. The "preparation for life" segment of the educational enterprise is indeed a venture into the uncertain future. Because of this, and related social changes, shifts in educational emphasis have been required toward increasing industrial involvement in training for employees, not only in scientific and technical affairs, but in social affairs as well.

It is easy to demonstrate that the forces which would encourage the extension of the formal system's responsibility for lifelong education are becoming stronger. Only examples of those forces can be cited here. There is the growing persuasion of research that preschool education, particularly as compensation for family and environmental deprivation, is perhaps a more important factor than has been thought hertofore.

Consequently, in a number of countries programs for three- to five-year-olds have either been implemented or are under serious consideration in policy formulation. Although there is much less experience in programming for that age group than there is in adult education, its acceptability to the formal system is much easier. It fits the "child" concept of schooling and extends opportunity for the employment of graduates and the use of classroom space when there is a surplus of these.

Closely related to the concern about the early start for child education, especially for remedial purposes, is the growing recognition of illiteracy among adults. On a world-wide scale, of course, this problem is startling. In 1970, over 34 percent (783 million) of the world's population aged 15 and over were illiterate and, by 1980, the projected estimate is that 29 percent (820 million) of the world's adults will be unable to read and write. Thus, with increasing world population, there is also an increase in the real number of illiterates. Even in the industrialized countries the problem is more serious than has been thought. Eight European countries report illiteracy ranging from 10 to 65 percent. The United States estimates it has 19 million adults who are totally or functionally illiterate, and this resulted in its recent "Right to Read Grants" to 31 States from the Office of Education. In England and Wales, Dr. Joyce Morris estimates there are likely 2 million adults who cannot read or write as well as an average nine-year-old and could be classed as illiterate or semi-literate. Her figures are partly based on an estimated seven to ten percent of school-leavers with poor reading ability.

Ultimately, the realization of illiteracy is an embarrassment to the social objectives of a democratic society and an inhibitor to the development aspirations of all.*

There is a force beyond adult illiteracy which must ultimately attract the attention of educational policy-makers; this is, the evidence of real demand for extended learning opportunities by the adult population. For example, recent estimates suggest that in OECD countries the largest expansion has been in noncompulsory education (usually above 15 years of age) where enrollments increased 26 million, while in compulsory education there was an increase of about 10 million. In interpreting this estimate, it must be appreciated that OECD member countries represent the more developed countries which can afford universal education and where, as is well known, the demand is likely to be made by persons with some education already.

An illustration of a different type, with different objectives but still of significance for social and economic development, is The Open University of Great Britain. In this instance demand has far exceeded places available and it is still growing. In 1974 there were 33,220 valid applicants for 15,000 places available in The Open University. In 1975, more than 52,000 people applied for 17,000 places (SESAME, Open University, Vol. 4, No. 5, Aug. 1975). Although in the initial years a majority of students tended to be teachers given exemptions for classes already taken in conventional universities, the trend now is toward a reduction in that group (the 30 percent quota for teachers was not reached in 1974) with increases from other sectors of the population, especially women (42 percent of those applying in 1974 were women compared to about 30 percent in 1971). A current experiment which involved in 1974-75 the enrollment of 500 students from the 18-year-age group, half of them eligible academically to enroll in conventional universities, the other half ineligible, may signal what potential such an open university system may have for education in a post-compulsory population. Although the budget provided The Open University has limited both the scope of its course offerings and the total enrollment figure, there are those who suggest that in the long run an even greater limiting factor on its enrollment will be the tendency, by its own leadership and indirect pressure, to open up conventional universities to accommodate adult students not traditionally considered eligible and who are forced by adult responsibility, or who simply prefer to take studies remote from the campus.

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*The realization of the world that an employee of an airline could not read the instructions for closing the baggage door of a DC 10 and thus caused the death of 346 persons in the Paris air crash, March 3, 1974 communicated much more than any conference on the importance of functional literacy in a technological world, and was quickly picked up by a British politician whose objective was to promote literacy programs.

As implied earlier, enrollment in the educational system tends to imply vocational/professional interest. Lifelong education is also concerned with the relevance of education from the point of view of the individual's needs and resources. Olkinuora states that, quantitatively, the consideration of this goal means the individual's wishes and demand for various kinds of education are taken into account in planning educational structure. Qualitatively, it involves such factors as promoting self-development and self-actualization, increasing possibilities for participation in cultural, social, and economic events, and education for creativity and a critical attitude. It is clear that these kinds of demands and qualities are not confined to young people, and their attainment cannot be achieved through youthful schooling alone. Their importance demands a lifelong process of learning in the contemporary milieu of social change.

Thus, we are faced with the notion that education reaches far beyond the limits traditionally assigned to it. The concept of education as a lifelong process affects every facet of the enterprise, including the nature of teaching and learning. Houle suggests that there are no data which permit a valid answer to the question of the extent to which the concepts of lifelong education or recurrent education have been accepted by (a) policy-makers, (b) educational administrators, (c) teachers at all levels and (d) the general public. Lengrand asserts, however, that "the State cannot remain aloof from a sector which is of vital interest to the nation." The notion that a person can accomplish his or her life span with "a given set of intellectual and technical luggage is fast disappearing." He suggests that "while a man's profession is no doubt the most important issue in his life, it still remains, in the educational context, at the periphery of his being." In line with this view, he presents the following case:

> "This naturally presupposes a policy of production in which the conditions and rewards of labour are not inhuman. It is possible in practice, using labor activities as a framework and point of departure, to lead the working man through appropriate methods to a broad and penetrating vision of the main features and problems of the society in which he has his being. Moreover, so-called general education, that is to say learning the use of the instruments of expression and of scientific knowledge, acquires its full significance and its strongest motivation when it prepares men to exercise their profession. With the prospect of increasing mobility of labour, the more education becomes generalized in the sense of the development of abilities and capacities, the greater will be its practical results" (p. 63).

Lengrand then suggests two responsibilities of education:

> First, the setting into place of structures and methods that will assist a human being throughout his life span to maintain the continuity of his apprenticeship and training, and
>
> second, to equip each individual to become in the highest and truest degree both the object and the instrument of his own development through the many forms of self-education (pp. 44-45).

A significant concern in the relation between education and development, and certainly in our ability to measure learning and establish educational indicators, is the present lack of information on the non-formal side of the educational enterprise. Several factors have led to this difficulty. The broad scope and the *ad hoc* nature of programs for adults make records difficult, compared to the more compulsory and captive population of the formal system. There is difficulty in getting recognition in the educational enterprise for learning which may result from the shorter term, less curriculum-oriented instruction in the non-formal programs. There has also been a limited effort put forth by agencies involved in the education of adults to evolve systems by which to record and estimate input, process and output variables.

The Stanford Research Institute has suggested a framework which helps to differentiate attainment levels in various aspects of the educational enterprise. It uses an optimum, a standard and a minimum level of goal attainment, each to be measured separately. Their schema is as follows:

Attainment Level	Category	Indicator Proposal
Optimum	Lifelong learning	Ratio of adult education
Standard	Changes to more equality	Enrollment ratios, by sociologically relevant classifications
Minimum	Elementary education	Illiteracy ratio

For "education beyond the high school," the Carnegie Commission on Higher Education made some recommendations which also direct us toward a more open and lifelong educational enterprise. The Commission asserted that the implementation of such policies could "make the post-high school experience more advantageous to many individuals and more useful to society." The recommendations included:

> to shorten the length of time in formal education;
>
> to provide more options;
>
> to make educational opportunities more appropriate to lifetime interests;
>
> to make certain degrees more appropriate to the positions to which they lead;
>
> to make educational opportunities more available to more people, including women, employed persons, older people, and persons from the lower income levels (p. 44).

Lifelong education* is an imperative as support for any policy involving balanced "socioeconomic" development. The implementation of the concept of lifelong education will require a learning process of the highest order among a wide range of policy and administrative leaders.

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* For a visual conceptualization of lifelong education see Appendix II.

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Chapter III

REVIEW OF SELECTED APPROACHES TO EDUCATIONAL INDICATOR WORK

The exploration of work on indicator development in this study was to determine where recent or current work on educational indicators had been undertaken, and to determine its nature. Since experience to date has not included an emphasis on lifelong education, the exploration was intended to test the extent to which approaches to educational indicator development in the formal systems might serve as models for applying the concept in lifelong education.

The work of nine agencies was selected from a somewhat larger number of those known to be working on the topic. All agencies selected met certain criteria, as follows:

a. They were considered to be reputable in terms of the expertise of their study resources.

b. Their work on indicators focussed either in whole or in part on educational indicators.

c. The theoretical/conceptual approach was available in documented form in the English language, and the documentation included a "listing" of the educational indicators either tentatively or finally agreed upon.

Thus, work undertaken by the following agencies was selected:

1. The Bureau of School Programs Evaluation (BSPE), the State Education Department, Albany, N.Y., U.S.A.
2. The Institute for Educational Research (IER), University of Jyväskylä, Finland.

3. The National Center for Educational Statistics (NCES), Office of Education, Washington, D.C., U.S.A.
4. The Organization for Economic Co-operation and Development (OECD), Paris, France.
5. The Office of Management and Budget (OMB), Washington, D.C., U.S.A.
6. The Stanford Research Institute (SRI), Menlo Park, Cal., U.S.A.
7. The Urban Institute (TUI), Washington, D.C., U.S.A.
8. The United Nations Economic and Social Council (EEC), Geneva, Switzerland.
9. The United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris, France.

It should be recognized that the work which is described on the pages to follow had a broad range of orientations. The range included those which focussed only on educational indicators, or on educational indicators as one key area of social concern among a number of concerns, or on human resource indicators, or on socioeconomic development indicators.

Each case study is described as briefly as possible in terms of its history, key objectives, theoretical or conceptual framework, methodology, relevant problems, etc., where these were available. It is recognized that in the interests of brevity some important details had to be omitted, but it is hoped that the outline will give the reader enough information to be able to note the distinct features of each case.

Due to the large number of indicators suggested through these nine studies, the listing of indicators has been compiled into a special report.*

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* The report listing the educational indicators developed by the nine agencies has not been printed, but copies are available at cost from the author, Extension Division, University of Saskatchewan.

In that report brevity was sacrificed in order that the exact wording of the indicators could be maintained. This, it was felt, would permit a more accurate interpretation of the stage of each study and greater ease in applying the indicators by those readers who wish to do so.

There are several ways in which the indicators could have been presented. They could have been presented as individual lists on a study-by-study basis. They could have been analyzed in terms of "input," "process" and "result." Since this latter approach is rather situational (i.e., an input indicator in one project may be a process or result indicator in another), this approach was discarded, although it appears to be an effective way to classify any case where actual situations are well known. Rather, the indicators have been roughly classified under the practical headings listed below. These categories are not mutually exclusive, but they serve to group indicators which are similar in content. The categories are as follows:

A. Societal characteristics

B. Educational attainment of population

C. Education for employment

D. Enrollment

E. Quality factors

F. Accessibility: Opportunities and constraints

G. Financing

H. Achievement

I. Efficiency-wastage

J. Attitudes-responses

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In 1967, the Bureau of School Programs Evaluation started to develop a program on performance indicators in education. The foundation of the project was earlier work on a "Quality Measurement Project" started in 1957. The aim was to study the feasibility of instituting a system of performance indicators for evaluating and improving the schools of New York State.

The Performance Indicators in Education (PIE) program was financed by an ESEA Title V. grant. In 1969 work commenced on developing a methodology and a set of mathematical models for generating performance data, and a system of computer programs was developed to deal with the data in the models. The first performance reports were introduced to local school administrators in 1971, and in 1972 a summary report (1) was prepared which described the school district reports and explained the overall framework for the studies.

Background Studies

In discussing this work it is useful to be familiar with a background study undertaken by the Bureau which surveyed available research closely related to performance indicators and their policy implications (2). The study reviewed 97 research reports and summarized its findings under: production-oriented theory, the construction of models for testing, techniques of model estimation, data systems used and the determinants of the level of educational performance.

It was found that there were two types of educational inputs most frequently theorized as affecting student achievement: those which are largely or completely insensitive to policy control, and those which can be manipulated by school administrators with the goal of improving student performance. Those insensitive to policy control included student socioeconomic status, student I.Q., school or district size, and student race. Those which were classified as "manipulative" included teacher degree status and experience, class size, books and other instructional supplies, and the number of special staff such as counsellors.

The study described a number of methodological problems in production analysis found in the 97 studies, suggesting there was evidence that the use of the production analysis models depends heavily on how completely they account for major educational inputs and the ability of their framework to answer policy-relevant questions. Also demonstrated was the extreme care which must be taken in choosing the statistical techniques in order to avoid ambiguous results and defeating the whole purpose of model building. The great importance of ongoing educational data systems in such an analysis was also demonstrated.

To help communicate the findings of the research review, the Bureau of School Programs prepared a publication as a manual for administrators (3). It provided the answers from research to ten key questions.

1. Does schooling matter?
2. What student or school characteristics, largely outside the influence of school authorities, seem systematically related to student achievement?

3. Can a mixing of students from different socioeconomic backgrounds lead to improvement in the achievement levels of lower socioeconomic level students?
4. Is student development in the noncognitive domain related to student cognitive development?
5. Do teacher-related factors seem to make a difference in the cognitive and noncognitive development of students?
6. What impact do school administrators and supervisors have on student development?
7. Is student cognitive or noncognitive development related to variations in the use of special supportive staff?
8. Are the instructional materials and educational technology related to differences in student achievement?
9. Is absenteeism related to student achievement?
10. Do financial measures serve as an indication of school quality?

The specific findings on which there tended to be concensus among a reasonable proportion of the studies perhaps give the most useful clues to building an analysis framework. Briefly, they included the following:

1. That it was possible to determine empirically whether variables thought to be related to the level of student development, in either the cognitive or noncognitive domain, really were related. Generally, relationships were found between input and output measures, with reasonably high concensus as to what inputs were related to student performance.

2. That certain inputs were consistently related to the level of student performance but were not amenable to policy control by educators. High socioeconomic status and high IQ were both related to high levels of

student performance, as was previous formal schooling.

3. That certain other variables which could be altered through policy decisions also were found to influence student performance, including teacher degree status, teacher experience, teacher socioeconomic level, teacher verbal ability, principal and supervisor quality, textbook quality, and ratio of staff such as guidance counsellors and social workers to pupils. However, the influence of these factors varied between the cognitive and noncognitive domains.

4. That at the college level, television and programmed learning methods resulted in student achievement levels equal to those obtained from the usual classroom methods. On the basis of the studies reviewed, this could not be generalized to other student levels.

5. That certain variables were not related to student performance, including variations in school and school district size, class size, number of supervisors and administrators per pupil and quantity of textbooks and other instructional supplies.

6. That for the controllable variables, which would improve student performance, other than teacher socioeconomic status and verbal ability, more extensive use would require greater expenditure, thus suggesting a strong relationship between cost and quality in education. However, the findings also suggested that if expenditures were allocated on certain aspects no improvement would be attained or even lower levels of student performance might result, e.g. quanitities of poorly qualified personnel might lower performance while a lesser quantity of more highly qualified personnel would improve school performance.

7. That high concentrations of low socioeconomic students resulted in student performance below usual levels expected due to just the effect of the students' own background. Thus, improvements in minority group and low socioeconomic level students' performance could be achieved if there was careful supervision of the way these students were distributed among individual schools. Placing them with students whose performance was relatively high could result in improvement of the performance of disadvantaged students.

8. That the high-quality schools tended to produce high levels of student development in both the cognitive and noncognitive domains and both were considered important to such schools. The development of the student in the noncognitive domain, it was commonly argued, could affect student cognitive development. In particular, the student's self-concept and attitude toward learning influenced performance.

9. That educational authorities could compensate for certain uncontrollable conditions by more extensive use of those resources under the control of school personnel. Since almost without exception the greater use of these resources was tied to higher cost, larger outlays of money would be required to produce a given student achievement level in districts having low socioeconomic and IQ levels than would be required in other districts.

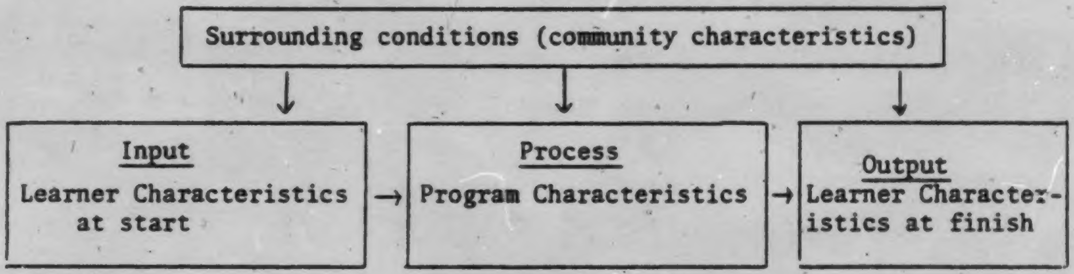
The "Performance Indicators in Education" Program

The basic approach of the PIE study was to relate important variables to the objectives of the schools. The objectives taken into account were: student achievement in cognitive/knowledge areas:

noncognitive functioning such as motivation and attitudes; and social functioning such as relations with other people or ability to be a constructive member of the community.

The framework used assumed, first, that objectives of the educational system must be stated, with the responsibility for the defining of objectives being shared by state and local levels; second, that measures must be selected or developed on each objective; and third, that data must be collected relating to each variable within the local jurisdiction specified. This approach could describe the situation as it existed. In order to predict performance under various circumstances the "predictor variables," related to the objectives identified, must be analyzed to determine the best "mix" of variables related to each objective.

Diagramatically, the concept of factors contributing to output were represented as follows:


Surrounding conditions (community characteristics)
Input
Learner Characteristics at start
Process
Program Characteristics
Output
Learner Characteristics at finish

In this framework, an indicator of a school's performance was taken to mean the difference between the two values of (a) the level of output which could be expected if the school's contribution to output was not significant and (b) the actual level of the school's output. Thus a high-performing school would be one which increased the achievement of its students beyond the level that would be expected after accounting for initial pupil achievement and external factors such as social and economic conditions in the community.

Actual output data were readily available from the Education Department. The expected output score for each district was developed through the use of regression analysis to create an equation which represented in quantitative terms the relationships between the input and condition variables on the one hand, and on the other hand, the output variables. By excluding variables having to do with conditions inside the school, it was assumed that some of the difference found between the actual and expected output scores could be attributed to variables left out of the equation, i.e., to intraschool conditions.

Weakness in the approach included missing input or surrounding condition variables and error in measurement, both of which could account for part of the difference between the actual and expected scores. The missing inputs could only be improved by improving data; to deal with error in measurement, confidence limits were computed for each expected score.

An advantage of the approach was that each school district could be compared with its own unique standard derived from its own unique characteristics; it did not have to be compared with other systems with different characteristics.

The study included 628 school districts in New York State omitting the five largest cities because of their unique characteristics. Focus was on district performance for grades three and six and on the gain in achievement from grades one to three and from grades three to six. By feeding each set of data into the appropriate mathematical equation (12 equations were developed for use in the study), information could be provided to the educational authorities involved on, first, the actual score for the district on any variable used; and second, the relationship between the score for the district and the scores on the same variable for other districts. The subjects, reading and mathematics, were used to determine the performance levels. An advantage in using these two subjects was the known fact that performance in reading is typically more a function of socioeconomic factors than is performance in arithmetic. On the other hand, performance in arithmetic is influenced more by within-school factors than is performance in reading. These "known" factors were important in interpreting the findings of student performance at the ages and grade levels examined. A major concern in the study, however, involved deciding what data to include which would aid each district in making hypotheses about possible factors that could be changed in the interest of improving the district's performance.

The PIE system was developed with several uses in mind. First, it helped policy-makers identify more objectively the high- and low-performing programs. Second, it helped to identify educational needs, determine appropriate approaches to meeting the needs, and evaluate the results. The data built up for the project may be used for other purposes, e.g., to determine school effects on drop-out rates and college-going rates and for use with the new "criterioned referenced tests." Its main implications were to reduce the element of chance in decision-making and to determine cost-effectiveness of alternative instructional programs and organizational arrangements. At the local level it made evaluation discussions more vital.

By the fall of 1974 a second round of reports were disseminated to school districts. The new reports provided analysis of results of tests administered in the 1971-72 and 1972-73 school years. U.S. Census data were used to represent socioeconomic factors in the districts, permitting the improvement of prediction. Almost all the districts in the State were included in this round, including the cities. By 1975 little progress was reported in either noncognitive or social functioning. This was due to the emphasis on cognitive functioning, to a reported lack of agreement on noncognitive and social objectives, and to less acceptable measures of noncognitive and social characteristics. Therefore the results continued to focus on reading and mathematics.

By 1976 the program was focussing on a series of analyses attempting to study the relationships between a number of school processes and achievement. The study of teacher variables (percent certified, percent with graduate credit, median salary, etc.) had been extended to 736 school districts in New York State, representing 99% of those which operate schools at the third- and/or sixth grade level. Expenditure variables (total expenditure, expenditure on teachers' salaries, expenditure on supervision, district wealth, etc.) were being studied in 705 school districts.

Another part of the study attempted to relate the student variables of percent attendance and mobility to achievement.

In these three study objectives, few consistent relationships were found. Several teacher variables were found to relate to achievement. The higher the salaries and the percent of certified teachers and teachers with graduate credit, the higher district achievement is likely to be. The analyses did not reveal whether cause and effect are inherent in these relationships. However, policy relating to these factors are also supported by logic and experience, and additional research would be required to determine the generality of such relationships.

No consistent pattern of relationships was found between expenditure variables and achievement. Neither rate of attendance nor student mobility was found to be related to achievement when socioeconomic factors were accounted for.

The Performance Indicators in Education project is an attempt to use a variety of educational data to study performance in school districts. It does not constitute a complete evaluation system.

In discussing the efforts in the initial Quality Measurement Project, Kenneth Richmond (4) commented:

> "If the New York example proves anything (and it is not unfair to those responsible for mounting the various investigations to say that they have so far failed to come up with a solution to the problem of relating inputs to outputs), it is that only a society which cares deeply about quality and equality will feel compelled to make constant evaluation its watchword. Outwardly, the most scrupulous and exhaustive inquiries may not yield any firm conclusions in the short run, but the mere fact that the inquiries are state-wide--that so many people care enough as to want to do something about it--helps create an invigorating climate of opinion" (p. 103).

The PIE project appears to be a continuation of that concern at local and state levels, and may have provided at least tentative answers to some input - process - output relationships.

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8. Irvine, David J., Studying School Processes Through the Analysis of School District Data. Paper prepared for the Annual Meeting of American Educational Research Association, San Francisco, California, April 22, 1976 (mimeo).

2. The Institute for Educational Research (IER)

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In the report of the Economic Council of Finland, entitled "Quality of Life: Social Goals and Measurement," 1973, a section was prepared by an "Education Working Group." The Group made "a study of the phenomena and problems, with their development tendencies, that are essential for the setting of educational goals in Finnish Society." It operated on the assumption that while "the goals of educational policy have not been officially established as derivates from those of social policy, it is sufficient to define the goal areas based on known policy and develop the required instruments of measurement." Basic issues included "who receives education, how extensive it is, and what its quality is." The basic problem was, "how does the education provided meet the requirements set by economic and other activities of society, and the requirements which provide sufficient opportunities for members of society to carry on their intellectual and skill-demanding activities?"

Three goal areas were outlined as follows:

1. Access to education referred "to the opportunities members of society have for receiving education."
2. Efficiency of education referred "to the utilization of resources with regard to results, the factors connected with educational institutions and pedagogy having particular emphasis."
3. Relevance of education referred "to the quantitative and qualitative applicability of education as regards the goals of individuals and society."

In addition, it was felt measures were required which would illustrate the output and changed state of the system. Two concepts were emphasized--measurement of the educational stock and the output of educational activity. The Education Working Group included in its report an empirical calculation of the educational stock in Finland for the age group 15-64 classified according to knowledge and skills, in the years 1960 and 1970, and an estimation for the year 1980.

It was on this basis that the Department of Applied Research of the Institute for Educational Research undertook its project on educational indicators commencing in the autumn of 1972. The project has been commissioned and financed by the Ministry of Education. In January 1973, the project employed one researcher (Professor Erkki Olkinuora) who has followed the OECD program on indicators. He has given considerable thought to the problems involving the development of educational indicators in line with the project's objective of studying possibilities in "the construction of a system of educational indicators for the help of quantitative educational planning."

Among the more difficult problems which Professor Olkinuora cites are:

a. the lack of a global comprehensive social theory or other conceptual scheme on which to base the indicators. This need also arises in trying to describe the connections between education and other social institutions and sectors, and the role of education in individual as well as in societal level welfare. Such a frame of reference should distinguish between the essential and the non-essential, analyze the essential into its component parts and the relations between these parts, analyze the relations between goals and means, and estimate the measurability of phenomena and construction of measuring devices.

b. the methodological problems of balancing input and output factors, i.e. "means" indicators are emphasized at the expense of actual social indicators; of developing relevant indicators for goals and subgoals; of taking into account essential information which is not quantifiable; of developing indexes and relating data to those indexes, and so forth.

c. the practical problems in indicator construction in such areas as obtaining data on educational stock on the time intervals required, of getting accurate data on those being educated, especially through manpower training programs, of making data from different sources commensurate; of relating educational statistics to other data concerned with social policy, e.g., social background; of obtaining statistics on the quality of education, and of getting sufficient data where investment is lacking in statistical agencies.

Professor Olkinuora also recognized the political implications of educational indicators, and suggested that "in practice researchers and planners are compelled to make decisions about goals because the goals defined by political bodies are seldom so explicit and concrete that they could serve as the basis of indicators without interpretation and modification."

The goals of educational policy defined by the 1971 Committee on Education in Finland have helped form the basis of thinking in the project and are presented here as statements of general interest. They were as follows:

1. Upgrading the educational level of the members of society and reorganizing the contents and methods of education in ways required by the control of scientific-technological and societal development.

2. Increasing educational equality by equalizing educational costs and educational opportunities and by improving the possibilities of overcoming learning difficulties.

3. Reforming the value and attitudinal contents of education in accordance with democratic principles and general goals of social policy.

4. Reforming the contents of education taking into consideration the principles of general human rights and the requirements of international interaction and cooperation.

5. Reforming education so that ever larger groups of people will be able to utilize the cultural services that society provides and will become capable of continuous development and enrichment of culture.

Among many of the useful questions which Professor Olkinuora raises are the following:

1. Is the system of educational indicators so significant that the preliminary plans should be submitted to the scrutiny of a system of specifically planned and organized political control?

2. Is it on the whole useful to try to construct indicators for such matters the relevance and exactness of whose measurement is not certain?

3. Is it reasonable to construct such a system of educational indicators that describes only some aspects of education?

His primary conclusion was expressed as follows: "The rationale for using a system of educational indicators, as a method of monitoring the effects of educational policy actions seems reasonable and worth the effort, but an essential condition for a successful implementation is to create a satisfactory frame of reference to guide the construction of broad and systematic indicators and to give due attention to methodological problems. In addition, a lot of research is needed to supplement the information provided by indicators and to improve them. The idea of educational indicators as a 'cybernetical' *system of societal guidance* does not, however, appear realistic at the moment on account of our deficient knowledge of invariances."

A list of educational indicators was presented as Appendix III in the Finnish *Quality of Life* document, as the *Report of the Working Group for the Study of the Goals of Educational Policy*. They were presented in illustrative form under several main headings; indicators measuring the effect of social conditions and social backgrounds of education, the efficiency of education (pedagogical, organizational and economic), the output of the educational system, and the impact of non-institutional education.

A frame of reference (see Appendix III) was developed, based on the cross-tabulation of goal areas obtained through a synthesis of the basic goals expressed in educational policy documents and of the controllable basic objectives of educational planning. Having established the frame of reference, the requirement was to produce objectives for each aspect of it which would provide the basis for educational indicator development. Having completed this exercise, it was determined that existing data did not permit the development of a comprehensive and strong set of indicators.

However, it did form a basis on which to start building in a systematic way.

During late 1973 and early 1974, the Institute staff worked further on a possible list of educational indicators, and on February 14, 1974, documented the "preliminary list." The preliminary list was developed to cover all aspects of educational planning and follow-up but due to the limited data available, the project was forced to limit its attention to selected areas, which were designated as 1) educational supply, 2) number of graduates and 3) public expense of education. The preliminary list cited some of the problems of measuring certain aspects included, and also outlined the methods proposed for calculating those requiring a formula.

The project was completed at the end of September 1974. The final report, entitled "The Theoretical Foundations of a System of Educational Indicators and Possibilities for Its Practical Construction," was presented to the Ministry of Education and the National Board of Education, whose task it would be to determine whether the system of educational indicators will be created. The report recommended that the Secretariat of Planning in the Ministry of Education should be responsible for producing the indicators concerning the quantitative aspects of education in cooperation with the Central Statistical Office of Finland; and the indicators describing the qualitative aspects of education should be produced by the Institute for Educational Research, University of Jyväskylä. These two types of indicators, it was recommended, should then be unified into one indicator report, including also their verbal interpretations by the Secretariat of Planning of the Ministry of Education.

On the basis of this report the Council of Educational Affairs (a body of trustees under the Ministry of Education which gives statements about affairs important from the point of view of the whole system of education) would prepare a short written evaluation, for example every fifth year, of the state of affairs and the trends of development in education--for politicians, coordinating bodies, sectorial planners, etc. It was considered important in educational planning that the system of educational indicators should be linked with the long-range planning of the Ministry of Education.

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3. The National Center for Educational Statistics (NCES)

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An exploratory study of educational outcome concepts and their policy applications was carried out for the National Center for Educational Statistics by the Public Services Laboratory of Georgetown University. The report on the study, completed in 1972, was considered exploratory, but represents the best published statement of the Center's progress in educational indicator work.

The focus of the study was on "educational outcomes" as an attempt to provide accountability for education, thus shifting from the prior emphasis on program inputs to the results achieved; the effectiveness of education.

The intent was to contribute to the debate on the issue as to whether American schools "are teaching their students the things they need to know to deal with life as adults and whether the schools in fact are providing learning."

The premise of the researchers was that while input measures, i.e. indexes of class size, expenditures per pupil, and teachers' salaries, are useful tools to measure the capacity and growth of a school system, they provide a limited view of a complex problem.

While the study focussed primarily on measuring the school system's effects during, and at the end of, the immediate enrollment process, there was some concern for measuring the need for additional training following conventional training.

It was considered important that in order to have a complete picture of the educational system, one must examine educational inputs and outputs, as well as the processes linking the two. Further, it was assumed that major policies are now dependent on outcome concepts and their measurement. Thus, one can describe and measure not only learning, but also the product of that learning. The policy uses cited for such measurements included: guide for needs assessment and the allocation of resources to meet those needs, to determine whether the outcome sought from budget and program decisions was actually achieved, guide to financial allocations, and as a specification of product for governments to use in procuring services that support or supplement public educational production.

Beyond broad policy decisions, indicators of educational outcome could have impact on various kinds of learning: the teachers' response to the child, the peers' interaction with the child, the parents' interaction with the child, and on setting challenging goals for children's aspirations.

Several other key concerns were taken into account by the Public Services Laboratory in approaching the problem of measuring educational outcome. First, while achievement scores were not questioned (although current tests may be) as measures of cognitive skills, they were considered to be only partial measures of what is involved in individual growth. Certain abilities, attributes and attitudes must also be considered. Concepts such as self-confidence, curiosity, love of learning, perception of self, perception of society were also to be taken into account. Second, there was recognition that present achievement tests may give advantage in measurement to "middle class" participants, and disadvantage to certain groups with language and cultural differences. New tests may have to be developed. Third, certain "proxy" indicators, which measure those factors which cannot be tested for, needed identification, e.g., does reading stand as a proxy for other verbal skills? Fourth, the problem of including multidimensional factors, such as time, had to be taken into account, relating, for example, to the issue of "sequence" in learning.

The project was based on the assumption that the educational product has both consumption and investment characteristics. "Product consumption" indicators sought to assess the extent to which school age populations, in terms of numbers, were included in the educational process at the various levels, and the quantity of graduates available for further study or occupational pursuits. Quality indicators sought to measure changes in educational competence. Because of the known important influence of the home environment on these quality factors, the educational indicators pretended to measure only the quality of the product, without associating it with either school or home.

"Investment indicators" attempted to illuminate the effects of education on income and employment. In this context, education was viewed as a "preparation for working life," and the effects of education on levels of earnings, unemployment and occupational pursuits were considered; other indicators, such as the educational levels of parents, took into account the "feedback payoffs to future generations of learners."

The researchers considered that investments in the educational product could be viewed as inputs into the quality of life and consumption of successive student populations as well as inputs into general development.

In a second time phase, secondary effects of investment and consumption provided indicators that reflected the feedback consequences of education. Also, consumer behavior patterns revealing expenditures on such items as reading materials, methods of using health and related personal services, were included on the assumption that education was an important contributing factor.

A third time phase considered the feedback from its own system over time; the effect of the distributions of earnings and employment in society, and in turn, the effect of such factors on the demands on educational products, the attributes of new students, etc.; in short, society's expectations of education.

Considering these problems, assumptions, etc., the project was developed around the following feedback framework.

Summary Classification of Outputs with Selected Examples

Time Phase 1 (Primary Effects)

Product Consumption		Investment	
Quantity	Quality	Income	Employment
Number of students High school completions, etc.	Attitudes Attributes Aptitudes Achievements (e.g. self-esteem creativity, IQ, SAT scores)	Value added Earnings Added earnings, etc.	School dropouts Unemployment rate, etc.

Time Phase 2 (Secondary Effects)

Investment Feedback	Consumption Feedback
Economic growth, (e.g. years of schooling, lifetime earnings differentials)	Consumer information Consumer efficiency Medical care use Use of leisure time Morals and citizenship values, etc.

Time Phase 3 (Tertiary Effects)

Intergenerational impacts

Educational motivation of children

A list of indicators was suggested by the researchers within the above framework. For each outcome measurement there was provided a definition of the indicator, the source of the material or the required statistics, the dates to which the data referred, how frequently the data were reported, the geographic divisions to which the data applied, and the relationship of the data to similar data available.

As a follow-up to this study, the National Center for Educational Statistics has an on-going project on "Educational Indicators That Measure Social and Program Progress." It lists four areas of investigation:

1. Review existing measures and indicators that are used to measure the effects of elementary and secondary education;
2. Formulate new measures of the effects of education, explore existing and new data sources needed to support new measures of progress, and explore avenues of applied research on measurement and data collection;
3. Assist the NCES in the development of future indicators of social and program progress; and

4. Assess possible policy implications and consequences of the use of selected alternative educational indicators.

Several uses for quantitative indicators of educational output were suggested: to make intelligent choices among alternative programs; to monitor the degree to which program objectives are met; to gauge the state and progress of education and alert national leaders to the need for new legislation. Another objective was to use educational indicators to guide the content of recurring statistical surveys so that they would provide data that:

- may be used to develop an overview of the state of public elementary and secondary education;
- help determine trends and indicators of progress or deterioration;
- identify sectors of the school population or of the educational system with problems, and assess the magnitude of these problems;
- provide benchmarks for program planning, and
- show the relationships between inputs and outputs of the educational system.

NOTE: It is worthy of note that following its work with the National Center for Educational Statistics, the Public Services Laboratory has been working under contract with the Agency for International Development to develop educational outcome measurement in developing countries. The project, commenced in 1973, has produced a number of useful reports, including the following:

a) An annotated bibliography on "Educational Outcome Measurements in Developing Countries" (1974)

b) A series of seminar reports under the general title of "A Guide to Educational Outcome Measurements and Their Uses" (1975)

c) A book entitled Educational Outcome Measurement in Developing Countries (in collaboration with The Institute of Development Research, Ethiopia) (1975)

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3. Correspondence with Selma J. Mushkin, Director, Public Services Laboratory, Georgetown University, Washington, dated Feb. 20, 1974 and Sept. 21, 1976.

4. The Organization for Economic Cooperation and Development (OECD)

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For a number of years the OECD, on behalf of its member countries, has been giving serious consideration to the improvement of measures related to the field of education. Of particular significance was the work on a comprehensive statistical framework for educational statistics. On behalf of OECD, Professor R. Stone prepared two publications which represent that work; Methods and Statistical Needs for Educational Planning (1967) and Demographic Accounting and Model Building (1971).

OECD has two internal bodies which work closely together on education in the context of social and economic development: the Centre for Educational Research and Innovation (CERI), which completed an initial experimental period in mid-1971 and was then given budget to continue, and the Education Committee, which was established in 1970.

CERI is concerned with research and development work and with experimentation on strategic innovations in the educational system. Its current program includes three areas of emphasis: Research into the Relations Between Education and Society--stressing educational strategies that take qualitative and quantitative aspects of growth in the 1970's into account, considering early childhood education, recurrent education and new functions and structures of the school; Development and Exchange of Innovations in the Teaching/Learning Process--stressing the international exchange of educational resources, especially in the area of curriculum development; and Strengthening National and International Arrangements for Educational Innovation--stressing a variety of projects having to do with creativity and innovation.

The priorities for the Education Committee's long-term work program also included three areas of emphasis: Main Directions of Educational Innovation and Reform--stressing educational research and development and the changing role of the teacher; Policies and Structure for Post-Secondary Education--stressing future structures, short-cycle higher education and post-graduate education; and Objectives, Planning, and Management in Education--stressing educational policies, the cost and financing of education, member country policy, planning and management, and educational statistics and the development of educational indicators.

The above program has been evolved as a result of two important activities of OECD. First, a Policy Conference on Educational Growth was held in 1970, and its findings published in Educational Policies for the 1970's (OECD, Paris, 1971). This report, together with the conference's seven working papers, provided an excellent documentation of the process and pattern of educational growth during the 1960's and the derived policy issues for the 1970's. Second, OECD has been assessing future educational prospects in the context of overall socioeconomic trends, which will lead to a policy report on the objectives and reform options open to educational development in the 1970's.

The work on "educational statistics and the development of educational indicators" has been undertaken by a special Working Group of the Education Committee. The impetus for the work came from a variety of sources; the general feeling the social goals need reexamination in light of the student disturbances in the late 1960's, the request of the member countries that the OECD Secretariat should elaborate a set of social indicators for society in general and specifically within the educational sector, and as a response to the new interests which governments have shown in a more rational and explicit method of accounting for the public sector. This latter factor has become a major issue in recent years as costs in the education sector have grown at 15 percent per year in OECD countries.

The Approach

Parallel with its overall approach to the development of social indicators, The Working Group first of all defined the basic objectives and concerns of educational policy in member countries, and then attempted to decide which indicators were most useful for monitoring progress or regression within each policy concern. In this context, the education system was assumed to be very "open," presenting great difficulty in distinguishing between the influences of "education proper" and the influence of the social structure as a whole.

The Working Group selected as its definitional criterion for a social indicator "membership in a social-system model as a parameter or variable." The emphasis was on measuring the impact of education on society--measuring performance. In this context, the depth of social reporting is extended into areas where the distinction between input and output has no meaning, since assessment of the condition of the society is based on its aspirations or goals. The OECD approach assumes that these aspirations and goals are reasonably reflected in the "basic objectives and educational policies" of member governments. Therefore, areas of apparently general concern were distilled from existing national policy statements.

A contrast approach, rejected by OECD, would have been to define social indicator as a relevant measure of welfare, concentrating only on measures of output or result (as in Towards a Social Report, DHEW, Washington, 1969). In this context, educational progress would be measured in terms of "achievement," involving factual knowledge and to a lesser extent affective aspects. This approach attempts to determine between means and ends, inputs and outputs, by using internal measures to determine the impact of education on society. The Working Group felt that since it is now generally accepted that the so-called internal measures are strongly related to societal influences such as family background (as by J.S. Coleman and Associates in Equality of Educational

Opportunity, HEW, Washington, 1967) this did not provide a reasonable option for its purposes. It was argued that "education serves many purposes and that indicators of performance must be multi-dimensional."

Because of the large number of possible dimensions of education, there was no attempt to be comprehensive. The number of dimensions were not only reduced as much as possible, but it was emphasized that those selected were tentative and pragmatic categories, subject to amendment and discussion.

The Resulting Framework

To the time of this reporting, the major policy objectives of education have been defined, and a system of indicators for measuring the attainment of the objectives has been agreed upon.

The major policy objectives selected were as follows:

(a) The contribution of education to the transmission of knowledge

Two aspects were considered: the number of persons participating in the educational process, and the knowledge and skills transmitted to each person during the educational process. The main indicators selected were annual enrollments, the level of education (by years) of those outside the formal system, and achievement scores of people undergoing education. The concept of "wastage" due to individuals dropping out of the system had to be taken into account. Measures which would take into account more general concerns, beyond factual knowledge, also had to be considered (such as suggested by H. Gintis in "Education, Technology and the Characteristics of Worker Productivity," American Economic Review, Papers and Proceedings, May 1971).

(b) The contribution of education to equality of opportunity and social mobility

Most countries are currently concerned with equality of opportunity and are disappointed with progress toward this goal. The concept of equality was considered: formal equality of access, reduction of group disparities, equality of educational resource input and availability of compensatory finance to achieve equality of opportunity to finance study, equality of educational achievement when performance is compared between social groups, regions and sex. Since socioeconomic characteristics become important to this policy objective, that concept was considered to have three dimensions--income of parents, education of one or both parents, and social class or race of parents. Concern was expressed in using the "socioeconomic" concept in terms of "measures of social origin" vs. "measures of stratification in the population as a whole" since it has been found that student and parent responses provide contrasting data.

(c) The contribution of education to meeting the needs of the economy

A great deal of work has been undertaken trying to estimate the relationship between education and economic development. Various approaches have been taken to define the quality of the labor force, and there are several problems cited. The availability of data is usually a major limitation. Since rates of unemployment must be considered, a problem is posed by two factors involving the estimation of labor vacancies by education; different educational backgrounds are suitable for a given job, and the concept of vacancy is a subjective one. Calculating the economic benefits of education is complicated, and involves the use of cost-benefit ratios in ranking investment options, the determination of the social rate-of-return on education (using gross lifetime earnings due to education in relation to the combined income foregone plus total current costs of educational institutions), and the determination of the private rate-of-return (using factors involved in the social rate-of-return but deducting taxes from gross income and also deducting all costs not borne by the individual from the sum of income foregone plus total current costs of institutions). Another problem involves the efficiency of information feed-backs from the labor market to the educational system.

(d) The contribution of the educational system to individual development

This area took three main aspects into account: first, the satisfaction of private demand for education; second, the satisfaction of requirements for individual development; and third, the amelioration of the quality of life. It was recognized that the ability to satisfy any demand for scarce resources, like the availability of education, cannot be separated from the price clients have to pay for it. Lower income groups have to pay a much higher price for education, relative to their incomes, than do people with higher incomes. Thus, a concensus usually must be reached on the division of the costs between the beneficiaries of education and the society as a whole. Other factors included the effect of examinations on early and late stages of enrollment and the degree of choice the educational system offers. On education and quality of life, factors such as the relationship between education and mental health, the difference between men and women in their opportunity to lead a varied and active life, and the problems of finding measures which have real meaning in relatively advanced countries were all considered. Cultural and recreational activities provided special problems of measurement, and were considered to be susceptible to elitist values.

(e) The contribution of education to the transmission and evolution of values

The Working Group considered this area important because the educational system in many countries is used to shape particular values. On the other hand, it was considered reasonable that the values also represented strong influences on the educational system. It was concluded that no indicators are presently available to deal satisfactorily with this area, although work needs to be undertaken on them.

(f) The effective uses of resources in pursuit of the above policy objectives

Although efficiency of the educational system was considered important, especially with rising costs and scarce resources, no acceptable indicator is available. A compromise would be to increase the knowledge about the internal functioning of the system and its relation to society as a necessary condition for efficient use of resources. Certain inputs into the system are controlled from within, others determined outside, still others fall some place in between (instrumental vs. exogenous inputs). But since they all act simultaneously, effective indicators must take that fact into account. The measurement of quality of education was of particular concern, since traditional measures, such as the level and type of the education of teachers, are now under strong question from recent research which suggests that teachers' verbal ability, recentness of education, and experience with the particular type of socio-economic group being taught may be more relevant measures of quality. Finally, of course, is the question of influence of all quality factors, given the now recognized nonschool influences.

While the OECD has continued to refine the work on educational indicators, it is noteworthy that during the 1975-76 period a set of measures associated with learning had been incorporated into the Council's program called "Common Development Efforts." A small group of countries with particular interest in health, education, employment, etc., was developing a survey to be carried out among a representative population of individuals in each participating country.

The social concerns and their associated indicators related to "individual development through learning" were proposed as follows:

Concerns and Sub-Concerns	Indicators
1. The attainment, maintenance and development by individuals of basic and further knowledge, skills and values necessary for their individual development and successful functioning as citizens in their society.	a) The proportion of individuals (in specific age cohorts) who have obtained specified results on specific measures related to basic and further knowledge, skills and values.
2. The organized opportunities available to individuals to acquire, maintain and develop the knowledge and skills necessary for their individual development and successful functioning as citizens in their society and the propensity of individuals to use these organized opportunities.	a) Regular education: Average years of regular education experience of the population. b) Adult education: The percentage of the total population that has participated in organized non-regular learning opportunities during the past year. c) Physical accessibility: The percentage of the population living within an agreed reasonable distance from the various types of learning opportunities.

d) Economic accessibility: Disposable income minus: i) grants and scholarships received; ii) full cost of post-compulsory education.

e) Disposable income minus net expenditure by households on post-compulsory education.

3. The individual's satisfaction with the process of individual development through learning while he is in the process.

4. The maintenance and development of cultural heritage relative to its positive contribution to the well-being of the members of various social groups.

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5. The Office of Management and Budget (OMB)

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The Office of Management and Budget has been working for a number of years to develop national social indicators for the United States.

In introducing the need for the program, the OMB suggested that "economic progress of the past decade has not solved all social problems. No one expected it to, but neither did we expect that so many difficult and controversial problems would be left unsolved in a modern society if that rate of real economic growth were sustained at levels of five percent or more." It was further suggested that although progress has been made with the assistance of government in many social areas, e.g., medical care, access to higher education, "these advances have not kept us from experiencing major upheavals and social discontent, and the improvements themselves may have helped bring on new and even more difficult problems. Not only are people concerned with the availability of social goods and services but they are now concerned about the quality of life of which those goods and services are a part."

In the initial work of the OMB, a distinction was made between performance indicators that would best measure the "concerns" statements, and "analytical information," involving statistics less useful for measuring the national picture but important for policy analysis because they pinpointed the groups most affected or identified causes of change in the performance indicators. It was later found easier simply to arrange the information by "social concern."

Several key distinctions were made in the selection of statistics, and two main criteria were used: those statistics which measured individual well-being, e.g., rate of infant mortality per 1000 live births or percent of age group graduating from high school and going on to college; and those statistics measuring outputs, which must go beyond looking at the processes by which social goods and services are produced.

In measuring individual well-being, statistics on certain direct measures given as examples above were found to be relatively easy to obtain. Much more difficult was the struggle to reach toward the more satisfying and meaningful measures of quality of life; e.g., statistics on the emotional costs of violence rather than just statistics on the changing dollar value of crime. It was also found that in certain social concerns there was a great temptation just to measure things; e.g., number of housing units, miles of road, number of automobiles, major pollutants of air and water. Rather, effort had to be made to find measures for more difficult aspects of the objective dimension on well-being; the percent of persons without adequate housing, the number living in poor neighborhoods, the percent having access to rapid, local transportation, or the percent of the population subjected to hazardous pollution.

Thus, it became more critical to select not only information on people, but also that which reflected outputs. Thus the problems of evolving measurable concepts, standards and risk levels had to be resolved, e.g., effective access. The work illustrated the need to face up to the important conceptual and statistical base required for the effective development of social indicators.

As will be noted, one of the major areas of concern was education, with specific attention being given to the development of indicators bearing upon the achievement of basic skills by young people and the opportunity to pursue higher and continuing education.

From among the social concerns, finding measures of output was found most difficult in education. The Survey of Educational Opportunity (the Coleman Report) was used to obtain statistics to measure the relative educational achievement between races and age groups. The Health Examination Survey of 1963-65 was used to help determine achievement among non-institutionalized children. A number of one-time studies were used to determine opportunities for students to attend institutions of higher education. The program used the test scores of the National Assessment of Educational Progress (described in Chapter IV) as measures of the knowledge, skills, attitudes and understanding possessed by individuals.

To date, the data on education are considered inadequate, and have been compromised by including more statistics on school attendance and high school graduation than on student achievement, with no information on college achievement other than graduation rates. As in many other such efforts in education, the OMB found that "there exists a great deal of data on enrollments, expenditures, teachers, buildings, and related input indicators, such as pupil-teacher ratios and per pupil expenditures, but little information on the important variables associated with learning, on the relative value of different learning experiences, or on just how well our education system is working toward its primary purpose of instruction."

A working objective of the OMB is to produce a publication on social indicators "as a tool in decision-making and as a guide in developing social statistics." The OMB report, Social Indicators, 1973, was the first of its kind to be published by the Federal Government. It stressed "descriptive indicators intended primarily to describe the state of society and the changes taking place in it, but included time series which revealed social changes and current trends." Current plans call for the possible biennial publication of a social indicator report. Social Indicators, 1976 is intended to be the next report, hopefully distributed in time for the Nation's 200th birthday. In Social Indicators, 1976 it is proposed that the eight major areas of social concern dealt with in 1973 (health, public safety, education, employment, income, housing, leisure and recreation, and population) be rearranged into a sequence of 11 areas, as follows: Population; The Family (new); Housing and the Community; Social Welfare and Security (new); Health and Nutrition; Public Safety and Legal Justice; Education and Training; Economic Activity; Income, Wealth, and Expenditures; Leisure, Recreation and Cultural Activity; and Social Mobility and Stratification (new). In this second report it is intended to stress to a greater degree than in 1973 the quality of education.

Long-term plans will be geared to provide comparative data in the international context, and to provide examples of possible measures for adaptation by other countries. Cohort analysis will also be included to provide useful insights into the "quality of life-experience" of selected age groups through time.

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5. Correspondence with Daniel B. Tunstall, Statistical Policy Division, OMB, dated October 31, 1973, and with Denis F. Johnston, Statistical Policy Division, OMB, dated February 13, 1975.

6. The Stanford Research Institute (SRI)

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The work of the Stanford Research Institute on educational indicators was undertaken as part of a larger project to devise master social indicators. The results of the project were presented under four main headings: 1. a heuristic model of society for categorizing indicator concepts; 2. a discussion of the interrelationships of goals, indicators and attainment levels; 3. an attempt to derive master indicators from a preliminary draft of the report referred to elsewhere, *Toward a Social Report*, produced by the Department of Health, Education, and Welfare; and 4. a brief outline of some key considerations in constructing a comprehensive national social data system.

The concept of "master social indicator" was considered imprecise, but an example of a measure of the "quality of life" in urban centers would be "a master social indicator reflecting the net effect of numerous sub-indicators, such as occupational and educational status, health, safety, housing and others."

The characteristics of the "basic heuristic schema" (See Appendix IV) involved the conceptualization of key components on horizontal and vertical planes. On the horizontal plane, society was divided into two principal parts, one signifying the social system, the second the dimension of individuals living within the social system. The schema thus assumed the need to measure the "quality of social performance" and the "quality of individual life" (see appendix V). On the vertical plane, the various interrelated levels were arranged from general to specific, starting with "the general good" (the most abstract of the concepts used) and moving down through increasingly more specific concepts: overall quality assessment (defining optimum, standard, and minimum), major components, elements of components, sub-elements, and indicators data.

The project considered the issues of goals and concensus, the measurement of progress values and attainment levels, and structuring attainment levels for the individual and for society. In considering individual attainment levels, the works of Maslow, Erikson, and McClelland were cited, all of which proposed a categorization of needs, against which the individual's overall welfare could be described. Such categorization is outlined below:

McClelland	Maslow	Erikson
4. Self-direction and control	Self-actualization	Identity
3. Mastery of external world	Esteem	Industry, initiative
2. Expression and regulation of effect	Belongingness and love	Autonomy
1. Protection and support	Security, survival	Basic trust

Thus it was assumed that "To the extent that individuals can afford to be concerned with their higher needs and are little constrained by their lower needs, they are free to actualize themselves in whatever way is most natural to them." The more they are able to do this, the higher the quality of their lives.

In considering the attainment levels for society, the project assumed that the "quality of society" must be measured "in terms of providing a satisfactory environment for the people comprising that society." The national goals set forth in Goals for Americans were used as the base, and since they were stated broadly there was no great difficulty in assuming agreement among citizens. The task was to break the broad goals down into the appropriate subunits to be useful. Such goals were broadly broken down into three sets; maintenance or preservation, the diffusion of benefits, and achievement or excellence.

The project used the eight major indicator areas in the HEW Social Report: environment; health and life; public safety; standard of living; race relations; opportunity; learning, science and culture; and democratic values. Each of these indicator areas was divided into a system of attainment levels: minimum, representing a minimum tolerance level for each category; standard, representing an intermediate level roughly equivalent to the national average or norm; optimum, representing the level which attempted to "enhance personal growth and fulfillment for the individual, while attaining the social goals of preservation, diffusion of benefits, and progress toward excellence."

The educational indicators resulting from the larger list of "possible indicators" which are of particular interest to this study, and include those devised by the Stanford Research Institute Project under the Social Report "indicator areas" of "learning, science, and culture" for the individual and for society, and an additional group selected from the area of "opportunity" (again for the individual and society) because of their significance in education. Of the total of 142 "possible indicators" of quality-of-life proposed in the Institute's report, 25 were of interest to educational indicators work.

The Stanford report presented its findings in the following framework, of which two examples are provided as illustrations:

Under Learning, Science and Culture:

Attainment Category	Subcategories	Possible Indicators
	(for the individual)	
Adequate for social functioning	Increasing educational attainment, especially among disadvantaged groups	Average years of schooling by area, income, race, status
	(for the society)	
Much extent and readily available	Public financing of education, teacher training, research and development arts	Public expenditures in these fields, scholarship availability

Under Opportunity:

Attainment Category	Subcategories	Possible Indicators
	(for the individual)	
Opportunity for personal growth	Opportunity to gain and enjoy leisure	Changes in leisure time available to people of different income and status levels
	(for society)	
No or inadequate opportunity	Discrimination in schools	Segregation, scholastic achievement, funding, school facilities, teacher qualifications

Since the Institute's report is one of the earlier attempts to devise social indicators (1969), it will be recognized that many of those suggested are more general than indicators which have come along in more recent documents. The "possible indicators" suggested tend to represent "statements of intent" rather than direct measures. Thus additional work would be expected before they could be used in practice.

Following work on "master social indicators," the Institute completed a study which investigated a novel approach to social indicators. Through a grant from the Environmental Protection Agency it developed a proposal for "minimum standards for quality of life." It focussed on quality of life minimums (QOLM)--"those minimum standards of life quality that are set by existing laws, court decisions, or common custom." In particular, it focussed on the most fundamental minimums beyond which quality may be considered intolerable.

A wide variety of QOL concerns in six categories were explored: economics, health, social, political, natural environment and physical environment. Within each category, three types of available information were compiled: 1) public laws and other less formal understandings that established minimum standards; 2) objective data (indicators) that reflect how well those standards are being met; and 3) subjective data that reflect how people feel about that aspect of the quality of their lives. For purposes of analysis and presentation, these types of information were further categorized in a matrix according to how they related to human needs.

Two basic need areas were used; basic (physiological and safety/security) and higher (social, ego and self-actualization).

Education was defined as a social need, which, like the right to vote and the right to legal defense, has a legal conception which infers it to be a basic QOL need. The primary minimum standard, though below usual compulsory levels, was inferred as minimal mastery of the "three Rs"--ability to read and write well enough to perform tasks such as filling out a job application, ability to count well enough to make change, and so forth (essentially in tune with the concept of "functional literacy"). This threshold is also readily amenable to monitoring.

Based on the results of this study, the Stanford Research Institute recommended that a limited set of eight to fifteen intolerability thresholds be selected for intensive monitoring and that a periodic report be prepared that portrays the percentage of various populations that fall below these minimum thresholds. The general conclusion reached by the study team was that the approach of using public standards that set quality of life minimums as a general guide for QOL assessment has sufficient feasibility and potential utility to warrant its further development.

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Correspondence with O. W. Markley, Senior Policy Analyst, Center for the Study of Social Policy, SRI, dated Sept. 14, 1976.

7. The Urban Institute (TUI)

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The Urban Institute has been working on the development of indicators for several years, and has produced a series of papers on "urban indicators."* Two of its studies are drawn on here, both of which should be considered as "Draft Working Papers."

Study I: Selected Education Indicators for Twenty-One Major Cities: Some Statistical Benchmarks

This project represented a preliminary work of the Institute, and experimented with descriptive indicators. The objectives of the study included: 1. to develop and present statistical benchmarks which could aid in the evaluation of education in larger cities; 2. to illustrate and discuss how these measurement techniques could be utilized to aid in such evaluation; 3. to suggest where further research and data gathering efforts were needed.

The conceptual framework used in the study involved a fourfold education indicator classification:

1. Educational Performance Indicators--output measures. The educational results that are achieved in the community.
2. Direct Educational Input Related Indicators
   Those factors which are believed to contribute to the education of youth and over whose allocation the educational authorities have some control. (These authorities do not determine the amount of resources available for educational use.)

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* Available documents in The Urban Institute's series on descriptive indicators include: "A Study in Comparative Urban Indicators: Conditions in 18 Large Metropolitan Areas." Paper 1206-4, 1972, and "Blacks and Whites: An Experiment in Racial Indicators," 1971.

3. Indirect Educational Input Related Indicators

   Those factors which are believed to contribute to the education of youth, but which are not usually the direct responsibility of educational authorities.

4. Educational Interest and Support Indicators

   The degree of commitment which a community makes to the education of its youth; the proportion of its resources it devotes to education.

Data were used from 21 major cities in the United States: New York, Chicago, Los Angeles, Philadelphia, Detroit, Houston, Baltimore, Washington, Dallas, Cleveland, San Francisco, Milwaukee, St. Louis, Boston, Pittsburgh, Cincinnati, Buffalo, Minneapolis, Oakland, Long Beach and St. Paul. Only data already available could be used, and in some instances these were quite crude. The authors indicate clearly that there are dangers of misinterpretation unless the readers for whom the report was produced--government administrators, businessmen, journalists and concerned citizens, understand the limitations of the study. For example, in addition to problems with the data, "inter-city comparisons" was selected from among other possible approaches to the study--city-suburban, city-state, and intracity comparisons, recognizing that such comparisons "may serve to mask significant variations." The data also limited comparisons to the urban public schools; data on private school education were not available.

Given such limitations, the study revealed some unexpected results, among them "surprisingly little correlation between the 'input' and 'output' variables." It was concluded that cause and effect relationships between input and output related indicators could not be assumed. Further, it was concluded that the indicators presented, although using the best data then available, should be used only as the best available estimate of the particular quantity being measured.

The study recommended that greater efforts be made toward obtaining more diverse, valid and reliable educational output indicators. It was suggested that "we need more diverse measures, since there is not agreement concerning educational goals. Valid indicators would measure what is intended to be measured, e.g., reading scores would measure reading ability and not attitudes toward the school or the teacher. Reliable indicators would represent measures that would result in similar values if the measurements were repeated." It was further asserted that "better output measures would not tell us how to correct deteriorating conditions. However, we could at least keep track of improving and deteriorating areas."

In spite of the fact that this 21-city study was conducted with less than ideal data and was a preliminary attempt to determine educational indicators, it makes a unique contribution to a "state-of-the-art" report on indicator development. Note: The Institute reports that this study is out of print.

Study II: Social Indicator Models for Urban Policy - Five Specific Applications*

This study was undertaken by the Urban Institute in a further attempt to evolve social indicators, with specific interest in the development of a conceptual model classifying social indicators and explicitly structuring the process of service or goods delivery. Five areas of social concern were used in the model: poverty and income, housing and neighborhoods, health and well-being, learning and education, and public safety and justice.

In "learning and education" as an area of social concern, the approach to the application of educational indicators involved a clear distinction between the processes of learning and the processes of providing education. Learning was viewed as "a consumption activity by which individuals acquire skills and knowledge," some of which are obtained in formalized educational settings. Education was viewed as "a production activity in which there is a formalized attempt to impart certain skills and knowledge to those participating." The attempt, then, was to specify indicators of the processes of education and learning and their interactive effects. A partner study of the Institute attempted to "categorize" the information requirements of decision-makers operating at different levels of bureaucratic and political hierarchies.

The model developed (see Appendix VI) attempted to recognize equally the production and consumption aspects in urban policy which interact to result in the provision of consumer satisfaction. The study assumed that, as in production efficiency, there are different levels of consumption efficiency as well. The study further assumed that there is usually an interpersonal interaction involved in service delivery, which prevents their temporal or spatial separation. This does not occur in the production phase.

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* This draft working paper has subsequently been expanded to include a conceptual treatment of the information requirements of educators at different organizational levels, and their interactions with consumer and political interests. See "Models for Indicator Development: A Framework for Policy Analysis," Harvey A. Garn, Michael J. Flax, Michael Springer, and Jeremy B. Taylor, 1975, Urban Institute Paper #URI 89000.

The model further attempted to view the education-learning process from the perspective of the learner. The values and needs of learners were seen as distinct from the values of the producers of educational services. It tried to recognize constraints imposed on learners by others (parents, family, peer groups, etc.).

In applying the model, it was suggested that a distinction should be made between the education of youth (often compulsory and not entailing large losses of income) and that of adults (where participation is usually voluntary and the costs are more explicit). Frequently the satisfactions of parents, not youth, result in the modifications of the education-learning process.

In the treatment of indicators* as "production transformation," the social indicator model was premised on a view that there were three primary activities associated with the production of educational services. These were: 1. instruction in instrumental skills, 2. imparting bodies of knowledge believed to be useful for further intellectual growth, and 3. inculcating cultural norms and values. Secondary production activities were those directed toward providing for the comfort and safety of students and increasing future performance (such as research, development, training and public information efforts). Inputs into these activities include a wide range of resources: finances, personnel, capital, organizational structure, educational technology and morale. Their availability depends on numerous opportunities and constraints, such as the availability of community resources, the political and social climates related to educational services delivery, and organizational structure and administrative efficiency.

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* The Institute's measures (indicators) are all intended to be used in the context of a conceptual framework.

It was further asserted that educational production activities produce external effects related to other aspects of society; they reduce resources available for other activities, and the jobs and income derived from educational activities are of significant economic and political importance in the community.

In the treatment of indicators as "consumption transformation," the social indicator model was premised on a view that "the learner may engage in numerous activities to facilitate his consumption of available educational services provided." Included were the selection of an appropriate educational program, attendance and participation in available course work, and expending the resources required. Future consumption can be facilitated by appropriate political activity toward changing curricula or levels of funding.

The interaction between the consumer and producer activities could result in intrinsic satisfactions to the learner, and also in what the study termed as "joint product stocks" such as the skills and knowledge acquired and changes in student norms and values. These joint stocks, e.g., the ability to read or to repair an automobile, could lead to a variety of satisfactions, e.g., a sense of competence or the pleasure of intellectual achievement.

Among opportunities and constraints cited were the market for skilled personnel and society's norms and values concerning education. It was assumed that the social contacts of the learner exert a strong influence over the consumption activities; e.g., parents may provide resources and encouragement, peer groups may exert influence on attitudes toward learning.

Society is affected by these educational consumption activities since time spent in educational endeavors is unavailable for other activities--in both occupational and personal areas.

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8. The United Nations Economic and Social Council (EEC)

c/o Palais des Nations, Geneva, Switzerland

The work on social indicators by the United Nations Economic and Social Council has been carried on by the "Working Party on a System of Social and Demographic Statistics" under the Statistical Commission and Economic Commission for Europe, Conference of European Statisticians. The Working Party had held six working sessions to May 1976; the Statistical Commission held its nineteenth session in November, 1976. Initial documents for consideration by the Working Party were developed by the Statistical Office of the United Nations.

The Statistical Commission determined that "draft guidelines should be prepared on a series of social indicators within the framework of the System of Social and Demographic Statistics (SSDS)."

It was assumed that the social indicator guidelines would be most useful to the statistically advanced countries, and that each might select those most appropriate to its needs.

Within the context of the SSDS, work on social concerns and social indicators has been carried on simultaneously (in contrast to the OECD program which tackled these tasks on a sequential basis). Attention has been focussed on the subjects, and not the goals, of social concerns.

The SSDS approach had several main features. It was intended to cover the general states of welfare, eliminating work on statistics of the environment to be dealt with at a later date. The social concerns defined were limited to "neutral" concerns, rather than normative concerns, thus permitting relatively greater agreement and the consideration of a wider range of living conditions. The availability, use and performance of government and other social services were included in the social concerns. Inputs, as well as outputs, were considered. The SSDS list did not include social concerns delineated in terms of individuals' perceptions or attitudes primarily, because, at this stage, the system did not cover this type of basic data.

The outline of the SSDS social indicators structure was as follows:

A. Population

1. Growth
2. Geographic distribution
3. Family, stability and cohesion

B. Learning and the educational services

1. Educational attainments of the population
2. Use and distribution of educational services
3. Educational achievement and efficiency of educational services
4. Inputs, outputs and performance of educational services.

C. Earning activities and the employment services

1. Labor force participation
2. Employment opportunities and security
3. Employment mobility
4. Employment compensation

5. Working conditions

6. Availability and performance of manpower services

D. Distribution of income, consumption and wealth

1. Levels of growth of household income and wealth

2. Levels of growth of household consumption

3. Redistribution of income and consumption

4. Inequality in the distribution of income, consumption and wealth

E. Social Security and welfare services

F. Health and health services

1. State of health

2. Availability and use of health services

3. Performance of health services

G. Housing

1. State and distribution of housing

2. Adequacy of supply of housing

3. Tenure of and outlays on housing

4. Public housing assistance

H. Public order and safety

1. Frequency and severity of offences and victimization

2. Treatment and characteristics of offenders

3. Performance of institutions

I. The allocation of time and leisure

1. The use of time

2. The use of leisure

3. The availability and use of leisure-time facilities

J. Social stratification and mobility

1. Social stratification
2. Intra-generational mobility
3. Inter-generational mobility.

The assumption of preliminary documentation on social indicators associated with education (learning and education services) was that "the population's acquisition and maintenance of effective skills, knowledge and values and the provision of suitable facilities for this purpose are fundamental concerns of governments. Individuals' skills, knowledge and values play an important part in their interests in, and capabilities of, participating in the economic and social life of a society and attaining satisfying incomes and living conditions." Because of the difficulty of collecting direct data on the skills, knowledge and values, practically all the suggested social indicators relate to inputs of formal education into individuals' skills, knowledge and values.

The program is concerned with both direct measures, e.g., degree of literacy at a given time, and classifications which provide trends (e.g., analysis by age and sex compared for consecutive dates). The SSDS documentation further outlined the reasoning behind the selection of each of the indicators and some of the sources of data which are to be used.

A special working group on Statistics in Education had held three meetings prior to Spring 1976, and had made considerable progress. A major effort was to tie the assembly of statistics and the related indicators within the framework of the International Standard Classification of Education (ISCED). An attempt has been made to group the indicators into major categories including--"pupils and students," "teachers," "finance and facilities," and "educational attainment." The group has worked to assemble all the social indicators in the field of education produced by international organizations (United Nations, United Nations Research Institute for Social Development, UNESCO and OECD) and by National Governments (see "Individual Data Systems in Statistics of Education", UNESCO:CES/AC.23/24, 5 April 1976). The problems of assembling statistics in the fields of adult and special education were being given serious thought and study.

While a final version of the SSDS guidelines on the series of social indicators was expected to be available in late 1974*, the work program on educational indicators was expected to continue until 1979, and included particularly the problem of educational indicators which can be commonly used by all or most countries. It is expected that this program will provide an interesting contrast with the indicators produced through the OECD program.

Appendix VII provides an interesting outline of work on educational indicators prepared by the Economic and Social Council, and is a rare illustration of thought given to the variation required in indicators to be applied in different types of countries--least-developed, developing and developed.

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* Every effort was made to determine the outcome of studies, surveys and other projects cited in these monographs. Regretfully, in a number of cases it was not possible to establish whether the projects were completed as planned. It was nevertheless thought valuable to include references to these projects and to indicate the expected time of completion. Readers who wish to follow up on these references are urged to contact the agencies or individuals involved. In all cases the mailing addresses have been provided.

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9. The United Nations Educational, Scientific, and Cultural Organization (UNESCO)

c/o 7. place de Fontenoy, 75700, Paris, France

UNESCO has undertaken several projects focussing on social indicators with a view to aid the policy-maker in social planning. Although it is also interested in cultural, communication and human rights statistics, at least three of its projects related specifically to educational indicators.

a) The Social Science Methods and Analysis Division, Department of Social Services

Between 1966 and 1971, the Human Resources Analysis Division carried on a project entitled "Toward a System of Quantitative Indicators of Components of Human Resources Development." In 1967 this work became known as the "Human Resources Indicators Project." In 1971 a new Division (title above) was formed to help emphasize indicator work to a greater degree.

The Human Resources Indicators Project was initially designed to identify and select indicators of human resources and to aggregate the indicators into a general index. In 1969 an Advisory Panel on Methodology of Human Resources Indicators was set up, and it focussed on a tentative list of indicators, the concept of human resources, the role of human resources in development, and the weighting of component indicators.

Human resources indicators were broadly defined and not limited to the traditional labor and labor potential viewpoint. Rather, they were seen in the broader context of social and economic development--social indicators, socioeconomic indicators and indicators of modernization. Using "economic growth" as a predictor variable was seen as a restriction to the human resources development concept, which included skills, abilities and attitudes and encompassed other social, cultural and welfare elements. Educational indicators were seen as inferential indicators of human resources, showing the "flow" aspect of human resources development.

Throughout the project coordination with other bodies such as the International Labour Organization (ILO), the Food and Agriculture Organization (FAO), the United Nations Research Institute for Social Development (UNRISD), the World Bank, and the U.N. was attempted by inviting representatives of these organizations to meetings held and by circulating working documents and reports. The project also worked closely with the Working Group on a System of Demographic and Social Statistics set out by the U.N. (Statistical Division of the Economic Council of Europe).

Approximately 30 study reports (see Appendix VII) have resulted, each discussing relevant aspects of the work; on methodology and measurement, on relating human resources to economic growth, on data use, on country studies and comparisons, etc. Of particular interest to this review is Study XXI, "The Selection of a Set of 'Core' Indicators of Socioeconomic Development," by Z. Helwig and S. Fanchette.

Of the seven "fields" of indicators listed, educational indicators were but one; however, most of the other groupings can be considered a part of educational interests; e.g., youth employment, stock of high-level manpower, educational attainment of the labor force, utilization of the labor force, and modernization of society.

Secondary phases of the project attempted to test and refine various approaches to indicator use. The classifying and the ranking of indicators were developed, as was the aggregation of indicators.

A variety of methods were tested in the project. In the construction by aggregation of complex synthetic index of human resources development, the project used distance-based methods, such as Wroclaw Taxonomy (see Monograph II, Appendix IV) and its variations, and the I-distance. In the selection of variables prior to aggregation it used factor analysis, the principal components method and factor analysis of correspondences (Benzecri).

The indexes developed were used primarily for international comparisons rather than for policy matters.

In 1972 new approaches to classification and analysis of indicators were tested in a project revising educational methods for Africa.

Of particular interest in country-level work was the determination of intra-country dispersion of human resources, the varying contribution of human resources components to economic growth, the reliability of statistical data and the actual meaning of indicators derived from them, and varying distributional implications of certain indicators.

It was believed that indicators required close scrutiny from the point of view of their conceptual relevance and of their appropriateness as indicators for the objectives of development. It seemed generally agreed that any final list of indicators should take into account a) the specific objectives to be attained, and b) each country's (or region's) movement on the ladder of development. This raised a further problem as to the definition of "the development level," itself a complex concept.

Discussions suggested that while ranking countries may have limited value when the countries are relatively developed, the ranking exercise can be effective in assessing the importance of indicators. If a ranking on the basis of some indicators is strongly disturbed by the removal or addition of an indicator, the inference would be that the latter is important and should be retained. The reverse would also be true--if a variable is removed and the ranking remains unchanged, that variable could be removed as redundant.

Another important matter considered was the conceptual separation of "cognitive" indicators and "decisional" indicators. The former concept uses indicators as descriptive features; the latter links them up to a value-judgment portent in the interpretation of those features. The first requires objective data, the second requires value (political) judgment. There was some support for the view that the social indicator movement is trying to be too comprehensive too quickly; rather, it should first devise the methods necessary for purely descriptive purposes, with the second phase, involving diagnosis and value judgments, to follow the maturing of descriptive expertise.

The project assumed that many of the socio-demographic series usually collected in countries would qualify as social indicators. The plans did not include work on subjective indicators or on social models, except to link various "human resource indicators" with GDP in a Cobb-Douglas function.

Various points were raised of specific interest to education. While it was agreed that certain factors could be considered as contributing to education, it would be difficult to measure the causal effects one might have on the other. Rather, one might try to link educational indicators with certain other variables, e.g., the indicators of mass poverty. It was also felt to be very difficult to construct an indicator of "equality of access to education," since such social justice is often assumed in an egalitarian society, but situational factors like rural-urban differences, make "equal access" different from "equal opportunity." Building an educational infrastructure would not be the same in a subsistence-level village as it would be in an urban area. Local level application was considered to be essential as a means of supplementing the problem of compromise which results when macro-level indicators are developed for international comparisons.

The last meeting on the project was held at the Institute of Development Studies, University of Sussex, England, in December 1973. There the Working Group considered various aspects associated with the results of the project in terms of data and indicator development. Specifically, discussions took place on applications in within-country disparities in development, the ranking of countries, the choice of variables, the analytic tools used, the statistics required, and the country case studies.

At time of writing the final reports of the project had still to be made public, but much progress had been made in defining issues, clarifying concepts and testing methods. Further, the experience of the project was planned to merge into a related new and broader UNESCO program which is just being initiated. It was comprised of three projects: first, a study on the applicability of socioeconomic indicators to development planning at the regional and national levels, including a number of country studies to be discussed at area meetings in Asia (Bangkok, 1974 and 1976 and Manila, 1976) and South America (Montevideo, 1976); second, an investigation initiated in 1973 into the selection of indicators of social and economic change, important to measuring development in the Second Development Decade; and third, research for the development of indicators of the quality of life and indicators of environmental quality, relating to the physical, social and cultural aspects of the working and living environment (initiated in 1975).

b) The Division of Educational Policy and Planning

The Division of Educational Policy and Planning is carrying out a project to develop a set of indicators that would serve as diagnostic tools for a rapid appraisal or evaluation of particular subsystems in one country at a time. The completion of the project was planned for 1975.

This project is of particular interest for two reasons: it is being designed primarily to help individual countries or regions diagnose their educational system, and it will attempt to avoid the use of complicated mathematical analysis which would make it difficult to use indicators where expert mathematical assistance is not available and thus also avoid analysis which tends to slow down the feedback from the analysis to practice.

In this context, the conceptual approach in the project was to view the diagnosis structurally as a pyramid, with comprehensive data being represented in the bottom of the pyramid, "educational indicators" in the middle of the pyramid, and "compound indicators" at the apex.

The data base would be perceived in the context of all data available and reasonably attainable, and which could be stored in a data bank for ready use. Based on empirical research, a set of "educational indicators" would be developed which would tend to reduce the quantity of information to be dealt with but which would provide a comprehensive view of the educational system. In turn, the educational indicators would be aggregated into "compound indicators" or indexes which would reduce still further the information load required.

In the use of the pyramidal framework for diagnosis, one would start at the apex, using the limited number of compound indicators as warning signals (dashboard signals), enabling the specialist to identify quickly whether there were major problems, dysfunctions and imbalances in the education system and generally, where such problems were located. The educational indicators would then represent a second step in the diagnosis, permitting the specialist to identify the exact nature, location and characteristics of the problems. For remedying the situation, the specialist would refer to all other information available (the bottom of the pyramid).

The Division's aim in the project was to consider "credible alternatives" to existing educational systems and subsystems. Rapid diagnosis was considered important, and indicators would represent a tool, a synthesis of pre-selected data measuring a given situation against a reference situation. Their use was considered comparable to that of a primary medical check. The project defined indicators as ratios (students per teacher), percentages (share of educational outlay in GNP), rates (participation of women in the labor force), or as indexes (costs per student by level and type of education whereby primary education equals 100).

The first phase in developing the set of indicators was to outline a conceptual framework for the project (aim, limitations, definitions, scope, approach and basic questions), and then, through questionnaires to field experts located in member states of the United Nations, to bring together information on their definitions, data available, and the relevance and desirability of an initial list of "Educational Diagnostic Questions and Data." Thus, almost unlimited numbers of questions were screened into various levels of the pyramid, culminating at the apex in the question: "To what extent is education satisfactory?" The screening process took place through the use of a matrix, with "relevance" on one axis and "availability" on the other. Thus "essential" and "useful" information which was either "readily" or "generally" available was maintained, "partially useful" and "difficult to obtain" data were discarded.

Education was viewed "as a subsystem of the overall system of society." Thus, a system of educational indicators "would try to measure, in quantitative terms, the relationship between the educational subsystem and the overall system which itself is composed of a number of other subsystems." Following this approach, three basic questions needed to be answered:

1. What are the inputs of the overall system into the educational subsystem?
2. What is the internal process of the educational subsystem?
3. What is the output of the educational subsystem?

This approach attempted to recognize that in the past diagnosis has often been limited to "discernible and quantifiable" features of education, such as enrollments, teachers and expenditures, all "peripheral to the aims, process and results of education itself--that is, the modification and development of students' knowledge, skills, attitudes, in due relation to their personality, their membership in society and their participation in the economy."

It was recognized, however, that any strict classification of indicators under "input - internal process - output" would not seem feasible. An example would be the qualification of teachers, which is a feature of teacher inputs into the system, while also a feature of the efficiency of the internal process of the educational system.

The project tentatively defined compound indicators as "highly selective and aggregative," capable of telescoping various information to a minimum of 10 and a maximum of 20 items, assuming that too large a number would defeat the purpose of efficiency as a signal system. Two examples of compound indicators follow:

a. Proposed Indicator of Rural/Urban Differences

First time, first grade enrollment ratio (national average)	First level education completion rate (national average)	Rural
First time, first grade enrollment ratio (national average)	First level education completion rate (national average)	Urban

This indicator was designed to reflect differences between rural and urban areas in the internal efficiency as well as the availability of educational services. First level is defined by UNESCO as consisting of education provided for children in all countries; entrance at five to seven years and consisting of five or six years of fulltime schooling. This indicator, then, would only be meaningful at "first level" of education, since in subsequent years (second level education) schooling would be taken in most instances in urban areas. The indicators would deal with both sexes together or separately.

b. Proposed Indicator of Regional Disparities in Educational Flows

First time, first grade enrollment ratio	First level education completion rate	Rate of progression to second level education	Second level education completion rate	Rate of progression to higher education	Minimum
First time, first grade enrollment ratio	First level education completion rate	Rate of progression to second level education	Second level education completion rate	Rate of progression to higher education	Maximum

This indicator was designed for subregions of a country, where comparisons might be deemed useful and where the data were available. The limitation of the indicator as designed above is that it refers only to two subregions (the worst and the best). Subregions which are between the two extremes are not dealt with, either to indicate their differences or their homogeneity. Numbers of regions could be dealt with by comparing all regions with a national average. However, this indicator would tend to hide extreme cases. To provide most insight, both approaches could be used, i.e., compare regions in pairs and in relation to a national average.

The Division of Educational Policy and Planning envisages all compound indicators (c) constructed in such a way that they would correspond to the condition $0 < C < 1$ and where values near to zero would represent the "red zone" near to 1 the ideal situation. The "upper limit" of the red zone would eventually have to be identified for each compound indicator, using real data for a series of countries. The objective was, then, to construct indicators the use of which would not require computers or even sophisticated calculators.

The Division has completed a list of "input" and "internal process" indicators. Its immediate future plans include the development of a set of "output" indicators. Its preliminary discussion of the latter has raised some worthwhile questions about the relation of education to social and economic conditions and requirements. Social aspects have recently tried to provide information "on how education contributes to the well-being of the individual as a member of society. Economic aspects measure, in quantitative and qualitative terms, the volume and suitability of the system's output with regard to the performance of useful and required economic activities."

Thus, the tentative questions posed by the Division include:

Social aspects:

1. What social characteristics of the population are likely to have important effects upon the concepts, attitudes and habits of those being educated?
2. To what extent does education prepare the learners to become useful members of a rapidly changing society?
3. To what extent does education contribute to social mobility?
4. What is the role of education in community development?
5. To what extent does education contribute to social integration?
6. To what extent does education contribute to improving disparities in income distribution?

Economic Aspects:

1. What economic aspects are likely to have substantial effects on:
   - the aims of education
   - employment opportunity
   - training requirements for employment?
2. To what extent does the output of the system correspond to manpower requirement (quantitative and qualitative)?

The final report of the project was published under the title A System of Educational Indicators, dated December 1974. That report contains the following content:

Part I: The Conceptual Framework
Part II: Selected Basic Data
Part III: List of Educational Indicators (with an annex which presents a discussion on some possible indicators requiring further research and/or special effort in data collection)
Part IV: List of Compound Indicators

No additional work on educational indicators has been undertaken by the Division of Educational Policy and Planning since that time.

c) The UNESCO Office of Statistics

Statistics in education is the most advanced of the UNESCO subject areas associated with social indicators, and this has permitted work on indicators of educational development to proceed most quickly. Until the late sixties statistics collected on education were of the classic stock, e.g., percentage of GNP allocated to education. As member states expressed concern for "flow statistics" rather than stock statistics, educational indicators to be considered took into account the separate sequential stages of the educational process. Thus, the 1971 UNESCO Statistical Yearbook showed for many countries a new indicator on educational attainment--an L Median of Educational Attainment--calculated for all censuses since 1945 and worked out for various age groups and by sex. Also new was an indicator of unit costs in education, taking the unit cost of first level education as 1. Teacher flows, teacher qualifications, teacher loads, curriculum and subject content, and examination pass grades are now included.

All statistics are now assembled and calculated on the basis of the International Standard Classification of Education (ISCED) (see Appendix I). Since 1969 the main enrollment indicator has been "age-specific"--broken down by level. This permits a "real" expression of enrollment in relation to population in each national situation. At third level education, i.e., education after a good basic education and leading to the specialized study of a subject (ISCED definition), the Office is seeking to relate the enrollment and output to comparable slices of the population and to evolve an indicator on the flow of students at this level. This approach is to be used to analyze wastage in the system (sometimes called internal efficiency), and maps out separately the incidence of dropout and repetition of years of study, noting the incidence of age retardation and relating the final output to the preceding events. Indicators have been developed on such aspects as the "input-output ratio," which seeks to quantify the effects of both repetition and dropout.

Much of the work of the UNESCO Office of Statistics is carried out in cooperation with the Conference of European Statisticians. This Conference, in turn, works closely with the Working Party on a System of Demographic and Social Statistics of the Economic Commission for Europe. In this context, the Office has put together, over a period of time, the statistics required for 15 educational indicators which can now be made available for a majority of member states. It appears that as related units of UNESCO and other sister agencies at the international level advance their work, supported by national census offices, this list will be increased and refined. No information is available on the conceptual or theoretical work of the Office, but the list of current indicators are available.*

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* Although the compilation of educational indicators from the foregoing nine projects is not published in this report, the lists of educational indicators produced by each project are available at cost of reproduction from the author, c/o Extension Division, University of Saskatchewan. However, a most recent sample of educational indicators as formulated by the Department of Sociology and Anthropology, Iowa State University, for the U.S. Agency for International Development, is provided in Appendix IX. The related schema of information needs in social development pertaining to the education sector is provided in Appendix X.

During the 1974 to 1976 period work has proceeded on educational indicators. The twenty-second and twenty-third plenary sessions of the Conference of European Statisticians, in which UNESCO participates, included in the agenda of the joint meeting on statistics in education an item on social indicators in the field of education. This leads to an examination of recent work on educational indicators by six international organizations and six national publications. The working group on statistics in education is expected to meet again in 1979.

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Chapter IV

TWO CASES ILLUSTRATING POTENTIAL FOR EDUCATIONAL OUTPUT INDICATORS

As has been indicated throughout this monograph series, there is a dearth of information on the product or result of educational effort. Toward a Social Report noted that "The Digest of Educational Statistics contains over one hundred pages of educational statistics in each annual issue yet has virtually no information on how much children have learned." This represents a common concern in much of the analytical and futuristic literature on education at all age levels, and poses one of the key challenges to the future of educational indicator development.

Therefore, in further assessing the state-of-the-art of work on social and educational indicators, it seemed important and useful to review two major projects which during recent years have tried to face squarely the issue of inadequate "output" data. The brevity required here hardly does justice to either the magnitude of the projects or to the experience and literature that each has produced. It is hoped that the reviews will provide sufficient information to interest readers to learn more about each project, and to follow their progress as they contribute to indicator development. It will be recognized, of course, that neither of the cases was designed to focus on the idea of educational indicator development, but each is pioneering in new approaches to educational measurement.

The two cases include the work of: The International Association for the Evaluation of Educational Achievement, and the United States project, "National Assessment of Educational Progress."

1. International Association for the Evaluation of Educational Achievement (IEA)*

c/o University of Stockholm, Fack, S-104-04 Stockholm 50, Sweden

The IEA is a nonprofit, nongovernmental organization, originally formed in 1960. It assumed legal identity when it was incorporated under Belgian law in 1967.

Collaborative work among representatives of Centres for Educational Research was initiated in 1958. Initial meetings were held in Hamburg and London in 1959. The concept of international studies evolved out of a conviction on the part of those involved that "further progress in comparative education could be made if there were added to the descriptive techniques already used the techniques of educational measurement." By this means countries could learn from each other; those methods showing promise of utility could be given priority and those producing unsatisfactory results could be avoided.

Each country is represented on the Council by an educational research institution, which has to satisfy certain criteria, e.g., ability to obtain access to representative samples of schools and students, ability to collect and handle data from the whole country, and access to funds to meet national costs. New countries may be added to membership at any time.

In early 1974 the Council had 22 members: Australia, Belgium, Chile, England, the Federal Republic of Germany, Finland, France, Hungary, India,

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*This summary on the IEA and its work is based partly on the IEA publications listed at the end of this report and partly on conversations with Dr. David Walker, formerly Director of the Scottish Council for Research in Education, associate editor of the Mathematics Report and author of International Studies in Evaluation IX, and with Dr. W. B. Dockrell, the present Director of the Scottish Council and a member of the IEA Council.

Iran, Ireland, Israel, Italy, Japan, The Netherlands, New Zealand, Poland, Rumania, Scotland, Sweden, Thailand, and the United States.

The international headquarters for the council was first housed in the UNESCO Institute for Education in Hamburg, then in the Wenner-Gren Center in Stockholm, and it was moved to the University of Stockholm in the Institute for the Study of International Problems in Education.

a) The Mathematics Project

A feasibility study in mathematics was undertaken in 1959 and finished in 1961. Encouraged by its relative success, the Council was encouraged to follow it with a full-scale study of mathematics in 12 countries--its first major project. The countries participating were Australia, Belgium, England, Federal Republic of Germany, Finland, France, Israel, Japan, The Netherlands, Scotland, Sweden, and the United States. Each country provided its own research data through its national research center and its own national costs. International costs (meetings, computing, publishing, etc.) were met by grants from the United States Office of Education. Achievement tests were used to measure the outcomes of mathematical instruction in groups totalling approximately 133,000 students, representing the much larger population. Data were also provided by 13,000 teachers and 5,000 heads of schools.

In addition to measuring outcomes, the achievements were related to input variables, e.g., the size of the class in which the student was taught, or to socioeconomic variables, e.g., the occupation of the student's father or the money available for school equipment.

The project was intended to help in answering some of the difficult questions relating to an international project of this magnitude; how to determine the contents and objectives of mathematics studies in the various countries, what items to include on tests, how to establish valid tests and run pre-tests, how to select representative samples of students, teachers, and schools, and how to determine and select variables.

An international committee gave leadership, and a team in each country completed a National Case Study Questionnaire which provided necessary background information about the school system and the country's economy.

The study showed there were differences in curricula and in the meaning of "school mathematics" from country to country. There was a substantial correlation between achievement and the teachers' ratings of "opportunities to learn." Age of entry into school, which varied among countries, seemed to have little effect on subsequent achievement in mathematics, and neither did a later age for completing the secondary course. There was found to be a marked difference, ranging from 4 to 18 percent, in the age-group in mathematics-science programs still in attendance at school at the pre-university stage. The socioeconomic composition of the pre-university group was also found to differ markedly from country to country. Further it was found that while the 13-year-olds following academic courses in selective schools (i.e., where students were selected because of higher academic achievement in earlier years) attained higher levels in mathematics than did students following similar courses in comprehensive schools (where no scholastic selection was possible), that superiority had disappeared at the pre-university stage. Achievement at the 13-year-old level was positively associated with the status of the father's occupation, but at the pre-university stage the association was nonexistent in most countries.

This study represented one of the first major attempts to carry out an empirical study of educational problems on an international scale.

b) The Six-Subject Study

This project was initiated in 1966, and continued to 1973. Twenty-one countries participated. A new feature of this participating group was the inclusion of four members representing "developing" countries whose educational systems were at various levels of development.

The six subjects selected for study were science, reading comprehension, literature, civics, French as a foreign language, and English as a foreign language. Not all countries took part in all subjects, and the table which follows shows the pattern of participation. By increasing the number of subjects from one to six certain advantages were to be gained, e.g., information required for the study of one was important to another and the opportunity for more countries to participate was provided, since each could select subjects most interesting and important to them and which could be handled by their research center. To spread the testing over time, it was agreed to obtain the data for three of the subjects in 1970 and the remaining three in 1971. There were, of course, rational reasons for selecting the six subjects from among the many possible; science corresponds closely to the mathematics measured in the original study, reading is a fundamental skill, literature is by nature less measurable than other subjects, civics was known to have marked differences from country to country, and languages incorporated interesting opportunities for measuring both cognitive (knowledge) and noncognitive or affective (attitude-interest) differences.

The populations to be tested included the following:

Population I - included all students in full-time schooling who had attained the age of 10 years but not the age of 11 at the time of testing.

Population II - included all students aged 14 and in full-time schooling at the time of testing.

Population IV - included all students who were in the final year of full-time secondary courses leading to university entrance qualifications, or of full-time courses of the same length.

A pre-test to determine whether 10-year-olds could participate, using questionnaires, was carried out in five pilot countries, using the students' mothers to check informational accuracy. The questionnaires were found to be accurate on "present" information, but information referring to the "past" or the "future" was less dependable. Thus care was taken in the preparation of the questionnaire.

Objectives appropriate to each subject studied were defined. For all subjects, interest lay in the relation between the achievements, interests and attitudes of the students and their environments at home, in school and in each country.

The approach in each subject was influenced by a multitude of factors important to it, such as recent changes occurring in the teaching of that subject, significant differences known between countries, financial and technological circumstances of the country involved, the focus of interest on knowledge vs. the student's ability to understand, and so on. In literature, for example, no absolute standards are possible and assumed standards relate to the aesthetic and cultural presuppositions of the country. In this context, it was hoped the study would give insights on the apparent conflict between scientific and humanist cultures.

Countries Participating in the Six-Subject Study

Subject	Science			Reading			Literature		Civics			French			English		
Population*	I	II	IV	I	II	IV	II	IV	I	II	IV	I	II	IV	I	II	IV
Australia		x	x														
Belgium (FI)	x	x	x	x	x	x	x	x									
Belgium (Fr)	x	x	x	x	x	x	x	x								x	x
Chile	x	x	x	x	x	x	x	x						x			x
England	x	x	x	x	x	x	x	x					x	x			
F R Germany	x	x	x						x	x	x					x	x
Finland	x	x	x	x	x	x	x	x		x	x					x	x
France			x														
Hungary	x	x	x	x	x	x	x	x									x
India	x	x	x	x	x	x											
Iran	x	x	x	x	x	x	x	x		x	x						
Ireland (Rep)										x	x						
Israel				x	x	x			x	x	x					x	x
Italy	x	x	x	x	x	x	x	x	x	x						x	x
Japan	x	x															
Netherlands, The	x	x	x	x	x	x			x	x	x		x	x		x	x
New Zealand		x	x		x	x	x	x		x	x		x	x			
Poland																	
Rumania													x	x			
Scotland	x	x	x	x	x	x							x	x			
Sweden	x	x	x	x	x	x	x	x			x			x		x	x
Thailand	x	x	x													x	x
U.S.A.	x	x	x	x	x	x	x	x		x	x	x	x	x			

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*The populations are defined in the text. Population III was reserved for a special group not discussed here.

Construction of Instruments

Test instruments were of three main types; those to measure knowledge, those to measure attitudes and interests, and those to obtain information from students, teachers and school principals on which to base the independent variables for the project.

Cognitive tests varied by subject. In science, for example, the International Science Committee constructed a grid with 53 possible [illegible]ject areas on one axis and eight teaching objectives on the other. The subject areas were reduced and refined by referring them to participating countries and by selecting those most common among countries. Teaching objectives were particularly important to agree upon, and a final decision was made to adopt from Bloom's (1956) Taxonomy of Educational Objectives the four categories of 1. functional information, 2. comprehension, 3. application, and 4. higher processes. (The categories of analysis, synthesis and evaluation of Bloom's Taxonomy, adapted to meet the situation in science, where these abilities are not necessarily arranged in hierarchical order and are ultimately related to the scientific method.) About 2,000 initial test items in science were reduced through country assessment and testing with small samples of students. Thus valuable data were obtained about the performance of some 700 items in a range of countries. No item was considered unless it applied to at least six countries. (This task of reaching such agreement was considered by the Committee a major achievement in international cooperation in educational research.) A test on understanding the nature of science drew heavily on the TOUS tests devised by Corley and Klopfer

(1961), and was used for populations II and IV. The final tests included 210 items on science and 30 items on understanding science.

In reading, tests were designed to measure reading comprehension, reading speed and word knowledge. In comprehension, selected passages contributed by national centers and universally acceptable were used, together with multiple choice questions. In all, 50 different passages and 445 different items were tested; 20 passages and 131 items were eventually selected. Each population was finally tested with 8 passages appropriate to the age level. Reading speed was tested by asking students to read a series of relatively short paragraphs (other than the 8 passages referred to above) constituting a continuous story and including 40 "items." Thus two scores were obtained; the first based on the number of the last "item" attempted from among the 8 passages, and the second on an error score based on the 9 items included on the first page of the test. To test word knowledge, word pairs, where the pair had to be judged as "nearly the same" or "nearly the opposite" in meaning, were arranged into three tests, one for each population.

Similar cognitive tests were constructed for the remaining subjects, each faced with its own unique problems and characteristics.

Attitude and Descriptive Scales

Developing instruments for this purpose was not only more difficult technically, but translation difficulties were even more pronounced.

Scales were most commonly used. In science, scales were constructed for population I in "interest in science" and "description of science teaching"; for populations II and IV in "interest in science," "description of science teaching (textbook/experimental)," and "description of science teaching (laboratory work: structured and unstructured)." In literature a 10-item scale was developed as a measure of transfer between literary and nonliterary experience, e.g., items such as "have you ever visited a place because you read about it in a story?", and a 10-item scale was developed as a measure of interest, such as identifying a number of plays read and then being asked to name them.

Questionnaires Seeking Information on Variables

These questionnaires sought general or sociological information to be used by the committees to develop lists of "predictor" variables. They were submitted to students, teachers and to school principals or their representatives. In reading, for example, they sought information on reading habits, the use of books and newspapers in the home, and teaching methods and facilities. In literature, information was obtained on reading preferences.

Sampling Procedures

The design in most countries was a two-stage stratified random sampling. Stage one randomly selected schools, in each country, which had students in the population being sampled. Stage two randomly selected students. Stratification aided the sampling by grouping schools of similar size, organization, and so on. The aim was that, in each school selected, about 30 students should be tested. By using this small a number, as many schools as possible were included. Some countries chose to exclude students retarded by more than one grade. Where an inadequate number of schools of a particular type participated, or where responses were not returned, a weighting system was used to compensate. In general, the International Committee felt satisfied with the sampling.

Administration

International committees were established in each subject area. Each National Center appointed a National Technical Officer to be responsible for the project in his country. Each was briefed from an "international coordination" point of view and provided with detailed instructions. Each school named a coordinator, to be responsible for the project and as the contact with the national center. Detailed manuals and instructions were important at the school level, particularly since mark-sense cards (to be read later by an optical scanner for transfer to magnetic tape) were used in the tests. The Measurement Research Center in Iowa City, U.S.A. processed the marked cards, and IEA's Data Processing Units in New York and Stockholm analyzed the data.

The magnitude of the data is reflected in the following summary on the number of participants in the three projects for which information is available.

Subject	Populations	Countries	Schools	Teachers	Students
Science	I	16	1917	9510	38,672
	II	18	2055	8216	48,714
	IV	18	1580	8241	49,732
Reading	I	14	1670		34,344
	II	15	1752		39,307
	IV	15	1209		29,474
Literature	II	10	1090	2560	23,400
	IV	10	880	3460	29,000

The Variables

The dependent variables were considered to be the "output" and the independent variables to be the "input" into and "process" within the system.

Thus, the dependent variables for the study were as follows:

for science - achievement in the cognitive tests and ability to understand the nature of science

for reading - achievement in the tests of comprehension, speed, and word knowledge

for literature - achievement in the cognitive tests, patterns of response to literary works, and interests in literature.

The independent variables included factors associated with age, sex, and home circumstances of the student, the organization, equipment and methods of the school, and features of the country's educational system.

The choice of independent variables was based, explicitly or implicitly, on hypotheses. An example was "that achievements in science are related to the sex of the student, boys showing superiority to girls." Some independent variables were indirect and incomplete indicators (termed surrogates or proxies) of the entities which the investigation sought to measure. For example, when teachers were asked to rate the items of the science test on the basis of their students' opportunity to learn the topic tested by the item, it was assumed that while most ratings would be reasonably accurate, some would be in error through faulty or incomplete information. It would in this context be a proxy indicator, and used only because a direct measure was not available.

Variables such as "age" had their own numerical value, while ones such as "father's occupation" required that a numerical value be assigned to them before they could be used as a statistical measure.

As has been noted, almost 2,000 variables proposed in the six-subject study were reduced to between five and six hundred before the project began.

The Methods of Analysis

The sample list of variables provided in Appendix XII represents some of those more commonly used in one project only--mathematics. In order to further reduce the number of variables, certain sets of variables were combined into "composite" variables, partly on rational and partly on empirical grounds. An example would be as follows: availability of reading material could rationally be regarded as a composite of a) the number of books in the home, b) the taking of a daily newspaper, c) the number of magazines coming in, and d) the presence and use of a dictionary. Variables such as "the socioeconomic level of the home" and "the study of science" were also put in composite form. Empirically, when it was found that the inclusion of some items in a "composite" contributed very little, such were omitted. A second method of reducing the number of variables was to use a "preliminary sifting" method, discarding those which in an initial analysis showed little promise of being useful. A third method was the use of regression analysis. In these ways the more important variables were disentangled from the rest.

The methods of analysis used had to take into account that the study was not longitudinal (in which the same group of students might have been followed over a period of time) or experimental (in which particular methods of teaching might be allocated to particular groups and the outcomes assessed). Rather, the study was "cross-sectional" in nature, examining a variety of students, environments, methods, etc., at a particular time. Thus, instead of assessing cause and effect, the study was limited to assessing "the probability that a suggested line of causation is feasible in the light of the data obtained." In some cases, data which might have been collected in the past had to be replaced by surrogates (or proxy data).

One type of analysis was the "between-countries" comparisons of achievement and attitude. The variables describing countries were arithmetical averages of the variables for the schools and for the student participants in that country. "Rank correlation" was the primary method employed. This method showed the degree to which such factors as structure or method used in each country were associated with high achievement.

"Between-schools" analysis was a second important unit of comparison, with many variables to deal with. In this case, many of the variables were averages of the scores, ratings and other data from the students and teachers in the school. Analysis was carried out separately within each country. Where the number of participating schools in a country fell below 50, results had to be treated with caution.

"Between-students" analysis was carried out within countries rather than within schools. Variables describing the student's home background, the type of school and program, and those describing the school and its organization, methods, staffing, and the attributes of the students were included.

All the variables used were considered "possible predictors of achievement." Some variables overlapped with others. In certain instances variables had to be assigned "weights." Regression analysis was selected as the best statistical method, and the following variations of that method illustrate its uses.

The "correlation coefficient" was used to test the strength of association between two variables. A high correlation between two variables does not prove that the first is the cause of the second, since there may be a third variable underlying both. Further, there is the possibility of "predicting" one variable on the basis of another, e.g., the science mark from mathematics mark, thus moving from a known value to an estimated value. "Standard scores" were used to compare members of different groups; "multiple correlation" was used in similar fashion where a larger number of variables were to be analyzed, e.g., reading comprehension with four variables with which it correlated--school environment, grade in school, hours of homework per week and sex of teacher. "Partial correlation" was used when it was desirable to know what the correlation between two of a larger number of variables would be if the others were held constant. "The scaling of variables" was used where sets of categories had to have values assigned to them for use in regression analysis, then making it necessary to convert the ratings to an appropriate scale using a selected criterion, e.g., reading comprehension in relation to the construct of a scale of occupations of students' fathers. "Preliminary sifting" involved a series of steps--removal of variables with missing data, peculiar distributions which rendered data unfit for analysis, and variables unfit because of low reliabilities. Partial coefficients were then used to divide variables into three classes--those input variables found to be positively and consistently related to achievement in all countries, those found to be so related in one or a few countries, and those where the relation was so slight as to be considered nonexistent. Thus, the number of independent variables was reduced to reasonable proportions. In "between-schools" analysis the number of variables varied from country to country, in the "between-students" analysis the same variables were used for all countries.

Two further techniques were used to calculate the coefficients of the regression equation, where the order in which the independent variables should be introduced into the equation had to be decided. The first technique, "blocks of variables," involved situations where earlier events determined by later events, but later events could not determine earlier events, e.g., the effect of home background or events associated with a student's school career prior to the school in which he was being tested. The second technique, "stepwise regression," used the computer to select the order in which the variable would be introduced to the equation according to the size of their contributions. In this context, the variable which was introduced first made a greater contribution than had it been introduced last.

By these means (as very incompletely described above) the several necessary tasks were carried out--to estimate the strengths of the associations between the criteria and the dependent variables, to combine variables into groups or composites, to eliminate those whose associations with the criteria were negligible, and to assess the relative importance of those remaining.

A final test of importance to the study was to determine the "performance" of the items of the tests and scales in different situations; the degree to which they were too easy or too difficult for the populations to which they were applied, and the degree to which they discriminated between "able" and "less able" students. To determine the relative difficulty of the items used, a "facility index" was constructed for each item, based on the proportion of students answering the item correctly. The "discriminatory" quality of the item was determined by calculating for each item a correlation coefficient relating the scores of the students on the item to their scores on the whole test. In some subjects a "distractor" index was also developed, based on the proportion of students choosing each distractor, i.e., the choices offered in multiple choice items which were incorrect but sufficiently like the correct responses to tempt the student who was uncertain in his knowledge.

Some Results

The results of the first three subjects (science, literature, and reading) have been published; the publication giving the findings of the remaining three subjects (civics, French, and English) is pending.

While it is not possible to deal with the findings adequately here, the following comments selected from a review of the literature education study by James R. Squire (IEA Newsletter, February 1974) will be of some interest in understanding the value of the study.

It was suggested that perhaps the most impressive thing about the study was "that we have it at all." It was found "that the reading resources of the home tend to exert a more powerful influence on student achievement in literature than does variance in patterns of schooling."

This fact, supported by recent national studies, pointed "toward crucial implications for parent education." There was evidence that "higher achievers in literature are individuals who seek literary experiences through film, radio and television, no less than through print." While the home, the community, and the culture appeared to have greater impact on student achievement in literature than did the school, the school appeared to influence the acquisition of preferred response to literature. It was suggested that "the study literally bugs educators to define the kinds of critical responses they wish children in any school population to acquire." The study provided validation "that students of the same sex and age in ten different cultures tend to respond to literary selections in many of the same ways." It was suggested that the IEA study can have permanent influence in modifying present strategies of teaching and learning, if it can help literary specialists "identify clearly the patterns of response desired as cumulative goals of school programs in literature."

The project on reading led to similar conclusions as provided by a review in the Newsletter by Warwick B. Elley. The results showed that "school factors contribute much less to variations in student performance than do home and socioeconomic factors." However, evidence of the contribution of schools was suggested in the finding "that countries with a long history of schooling achieve at much higher levels of reading skill than developing countries." Reading skill also related to the indirect measures of family background such as parental occupation, educational level, and number of books in the home. Contrary to the study's hypothesis,"girls are not superior to boys in reading skill in all countries." In the English language a very high correlation was found between comprehension and word knowledge, suggesting that vocabulary size is important. The "number of hours devoted to homework," "the extent to which the pupils perceived their classroom environments as authoritarian," and the "presence and size of classroom libraries" were important to reading comprehension, the latter more so than "size of class," "extent of grouping," or "qualifications of teachers."

There was little difference in achievement in any subject among advanced nations. The "opportunity to learn" was a critical factor to achievement in the cross-national comparisons.

Some Limitations

While these tend to be provided in great detail in the study reports, it is useful to mention here the following:

1. Sampling was criticized as it was used in a few countries. Procedures which were geared to select from the better schools made international comparisons invalid.
2. Non-response further provided difficulty in sampling and in providing sufficient data for the effective use of some statistical techniques.
3. Orientation was insufficient to ensure that all schools, especially in remote areas of some countries, gave uniform interpretation to the instructions provided.
4. Type of study, using a cross-sectional and stepwise multiple regression approach, while dealing reasonably with short-term effects such as school programs, was not adequate to take longer term effects, such as home influence, into account. Longitudinal studies are required.

5. Test items could be improved, as, for example, the reading comprehension tests, which evidently had a high proportion of "inferential reading items," requiring the students to go beyond the passages provided to reason out their answers, thus favoring the students with broad background.

The IEA Data Bank

With the assistance of a grant from the Ford Foundation, the IEA established a data bank at the University of Stockholm. Work has been under way reformatting data sets, editing data, and developing new publications to make its data as available as possible to outside researchers.

Present plans call for complete data banks at educational research institutions in Stockholm, Tokyo, Melbourne, Chicago, New York and Stanford (California). Users seeking the data can now obtain them from the Stockholm center; IEA, University of Stockholm, Fack, S-104 05 Stockholm 50, Sweden. Two forms are available, one for IBM 360/370 computer systems, the second for all others. The recently defined conditions of release of the data provide for easy and rapid access to data by qualified researchers. Instruments and code books were to be published, beginning in mid-1974. Within any subject at any age level, several hundred variables will normally be available for use.

Future Directions

A conference of IEA was held at Harvard University in November 1973. It reviewed the IEA Six-Subject Survey, which officially ended on May 31, 1973. Following this very large project, which was "unparalleled both in terms of the number of variables to be handled and the complexity of its administration" (as stated by IEA Chairman Torsten Husen), one proposal is to repeat a study of mathematics. In general, the intent is to introduce studies which will "get into the classroom and find the mysteries of how learning works" (as stated by Dean Paul Ylvisaker of Harvard at the conference).

There will be, of course, many uses for the data once they are systematized and validated, and can be assembled over time. Longitudinal studies are likely to become an important trend for the IEA, and within national research centers, specific studies in depth and geared to clarify the answers to the questions raised by the international studies are to be encouraged.

As one means of encouraging the use of the resources to be provided through IEA, the Association has initiated a program of pre- and post-doctoral fellowships, financed by the Spencer Foundation. Two fellowships have been offered annually for five years in each of the two categories.

Publications of the IEA

1. Foshay, Arthur W., et al. Educational Achievements of Thirteen-year-olds in Twelve Countries. UNESCO Institute for Education, Hamburg, 1962.

2. Husen, T., et al. International Study of Achievement in Mathematics: A Comparison of Twelve Countries, Volumes I and II, New York: John Wiley & Sons, Inc., 1967.

   Volume I gives a detailed account of how the study was designed, problems, hypotheses, sampling procedures, data collection and data processing. Volume II comprises the outcome of the international analysis.

3. Wolf, Richard M. Data Bank Manual, IEA. Almqvist & Wiksell, Stockholm, 1967.

   A booklet which outlines Phase I of the "International Study of

Achievement in Mathematics: A Comparison of Twelve Countries," including the target populations, sampling and weighting, procedures for using the data bank, possible analyses and a list of variables available as used in the mathematics project.

4. Comber, L.C., and Keeves, J.P. Science Education in Nineteen Countries: An Empirical Study, International Studies in Evaluation I, Halsted Press, 1973. ($9.95)

5. Purves, A.C. Literature Education in Ten Countries: An Empirical Study, International Studies in Evaluation II. Halsted Press, 1973. ($9.95)

6. Thorndike, R.L. Reading Comprehension Education in Fifteen Countries: An Empirical Study, International Studies in Evaluation III. Halsted Press, 1973. ($7.50)

7. Lewis, E. Glyn with Massad, Carolyn. International Studies in Evaluation IV: English as a Foreign Language in Ten Countries, An Empirical Study. Amquvist & Wiksell, Stockholm (forthcoming).

8. Carroll, Jon B. International Studies in Evaluation V: French as a Foreign Language in Eight Countries, An Empirical Study. Almqvist & Wiksell, Stockholm (forthcoming).

9. Farnen, R.F., Marklund, S., Oppenheim, A.N., and Torney, Judith V. International Studies in Evaluation VI: Civic Education in Ten Countries, An Empirical Study. Almqvist & Wiksell, Stockholm (forthcoming).

10. Passow, A. Harry, Noah, Harold J., and Eckstein, Max. International Studies in Evaluation VII: The National Case Study, An Empirical Comparative Study of Twenty-One Educational Systems. Almqvist & Wiksell, Stockholm (forthcoming).

11. Peaker, G.F. International Studies in Evaluation VIII: An Empirical Study of Education in Twenty-One Countries, A Technical Report. Almqvist & Wiksell, Stockholm (forthcoming).

12. Walker, David A. International Studies in Evaluation IX: The IEA Six-Subject Survey, an Empirical Study of Education in Twenty-One Countries. Almqvist & Wiksell, Stockholm (forthcoming).

13. Data Bank Bulletins

    IEA Six-Subject Data Bank Bulletin No. 1, November 1973.

    IEA Six-Subject Data Bank Bulletin No. 2, March 1974.

2. National Assessment of Educational Progress

c/o Education Commission of the United States, 700 Lincoln Tower,
1860 Lincoln Street, Denver, Colorado, U.S.A. 80203

National Assessment of Educational Progress (NAEP) is a large-scale attempt in the United States to measure "educational outcomes" in that country. It involves an annual survey of the knowledge, skills, understandings and attitudes of selected groups of young Americans. It is designed to provide both the educational community and the public generally with information on: a) selected aspects of educational attainment in certain subject areas, and b) any growth or decline in these educational attainments over the years.

Origin of Project

The project began in 1964 through the Exploratory Committee on Assessing the Progress of Education (ECAPE), established by the Carnegie Corporation, and chaired by Ralph Tyler, Director of the Center for Advanced Study in the Behavioral Sciences, Stanford, California. The idea of NAEP was conceived by Francis Keppel, Commissioner of Education from 1962 to 1965, John Gardner, President of the Carnegie Corporation, and others, in response to concerns about whether the needs of education in the country were being met adequately. The first progress assessments took place in 1969.

The work of NAEP is carried out by a special staff, and financing was initially provided from several sources; the Carnegie Corporation of New York, the Ford Foundation's Fund for the Advancement of Education, and the U.S. Office of Education. The project is presently funded entirely by the National Center for Education Statistics, Department of Health, Education and Welfare

Scope of Project

The project attempts to provide dependable information describing what young Americans, aged 9, 13, 17, and young adults 26-35 know and can do. For all but young adults, ten subject areas are assessed, and a timetable for the project has been worked out to 1980 as follows:

1969-70	Science, Writing, Citizenship
1970-71	Reading, Literature
1971-72	Music, Social Studies
1972-73	Mathematics, Science (2nd assessment)
1973-74	Career and Occupational Development, Writing (2nd assessment)
1974-75	Art, Reading (2nd assessment)
1975-76	Citizenship, Social Studies (2nd assessment of both)
1976-77	Science (3rd assessment)
1977-78	Mathematics (2nd assessment)
1978-79	Reading (3rd assessment)
1979-80	Humanities (Music, Art and Literature) (2nd Assessment of each)

Data on the young adults were collected for only the first five years of the assessment. Thus NAEP has baseline data on adult performance for nine of the ten learning areas (all subjects except Art). As funding allows, the young adults will again be assessed and their progress determined.

The normal assessment of the ten learning areas will be supplemented by special "probes" which will be added to the schedule as funding and interest allow. For example, Basic Mathematics is tentatively scheduled to be a special probe during 1975-76, administered in two "packages" to

13- and 17-year-olds. A similar probe in the Area of Career and Occupational Development is being planned for 17-year-olds.

Certain revisions were required as the project progressed, and it is intended that other subjects be added in the future.

Nature of Assessment Approach

The various subject areas, as indicated in the foregoing timetable, were systematically organized into objectives and sub-objectives, themes and exercises (questions and tasks).

An example of the stating of primary objectives, is outlined below from the 1972-73 listing for science:

Objective I	Know the fundamental aspects of science.
Objective II	Understand and apply the fundamental aspects of science in a wide range of problem situations.
Objective III	Appreciate the knowledge and processes of science, the consequences and limitations of science, and the personal and social relevance of science and technology in our society.

The themes in reading were: understanding words and word relationships, graphic materials, written materials, reference materials, gleaning significant facts from passages, main ideas and organization, drawing inferences, and critical reading.

An example of an exercise in reading to assess the competence of 13- and 17-year-olds in drawing inferences from given information was as follows:

> "Art says that the polar ice cap is melting at the rate of 3% per year. Bert says that this isn't true because the polar ice cap is really melting at the rate of 7% per year."

We know for CERTAIN that

_____ Art is wrong

_____ Bert is wrong

_____ They are both wrong

_____ They both might be right

_____ They can't both be right

_____ I don't know

A series of exercises constituted a "package" which involved the time of a respondent for approximately forty minutes. Some exercises differed for the different ages assessed, others were identical for all ages. Assessment exercises were designed as easy, medium and hard, so there was a possible gradient measure of knowledge and skills. Naturally, considering the variety of ages assessed and of subject areas, the nature of the exercises varied greatly. Assessment of knowledge levels was undertaken through paper tests, as outlined above; skills demanded the "performance" of tasks, e.g., playing a musical instrument, and so on.

Framework for Decision-Making

NAEP involved hundreds of scholars and subject specialists, as well as administrators, measurement experts, businessmen and laymen from all sectors of the country. The objectives, and sub-objectives which tended to define the "standards" to be expected, were initially those which the school system was trying to achieve, identified through the involvement of both school and nonschool people. Three basic criteria had to be met: first, they had to be accepted as educational tasks by the schools; second, they had to be considered important by scholars; and third, they had to be considered desirable by other thoughtful citizens.

In the development of exercises, "ordinary people" were selected to help in their development, especially to help eliminate or change those which might be considered offensive by respondents. Review conferences were called, with citizen representation from each major area of the country, from different-sized communities, from different races, religions, sexes, and economic levels, and from different organizations interested in education. In practice, the review conference participants were divided into "panels," and each exercise received review from two to four panels. NAEP staff acted as resource persons to the panels and due to inevitable conflict of opinion had to make final decisions on the detail of each exercise.

Subject-matter specialists helped assure that each exercise was "valid" in terms of the educational objective for which it was written.

The Populations Assessed

Stratified random sampling procedures similar to those used in public opinion polling were used to determine participation in the assessment. Approximately 80,000 to 100,000 people in the selected age groups participated as respondents each year. No one individual undertook all the exercises, since this might require as long as 14 hours, so that approximately 2,500 completed each exercise. Those 9, 13, and 17 years old were assessed in schools, the out-of-school 17-year-olds and 25-36-year-olds were interviewed individually in their homes. Names were not required on any of the exercises.

About 50 percent of the exercises given are reported each year, along with percentages of correct and incorrect answers. Remaining exercises remain confidential until after a subject area has been reassessed in future years. Results are reported, by age sampled and also by geographic area, size and type of community, sex, color and parental education. Results come off the press about one year after the completion of testing.

Some Limitations and Implications

One critical question is the degree to which NAEP results can be considered an "educational indicator." There appears to be some consensus that, in terms of the current state-of-the-art, it provides one of the best overall output or result indicators developed to date through any program. Further, it can be argued that each output measure for an exercise is a valid kind of indicator for the particular factor reported. National levels of performance for each age group provide individual reference points for each exercise. A new kind of standard is set in each subject and in each exercise. The results in performance in various sub-groups in relation to the national level describe how uniformly learning is spread among the sub-groups. Changes in performance levels in the assessment cycle indicate change in competence over time in any given task or subject area. The proportions of the population with acceptable responses can also be determined. Further, it can be determined at what age levels acceptable responses tend to be attained.

An important feature of the NAEP program is that it was designed to remain apolitical, i.e., it does not directly evaluate persons or schools or states. Rather, involving a somewhat democratic process outlined in the foregoing, it simply provides descriptive information, reliably assembled and based on clearly defined criteria and objectives, and through carefully articulated exercises and tasks which serve as standards. In this context, no one is threatened by the project, and perhaps this had led as much as anything to the acceptance of the assessment system developed by NAEP by entire states; to 1975 the states of Connecticut, Louisiana, Maine and Minnesota had adopted the model; Pennsylvania and Michigan had assessment programs which were not based on the NAEP model. Individual schools have also chosen to review their attainments in the light of NAEP findings.

It is recognized that NAEP will improve through its own and related experiences. To date it has certain gaps in its data base, e.g., it collects no information on the nature of the educational programs to which the respondents have been exposed. However, it is actively concerned about the question of background variables and has assigned a professional staff member exclusively to researching this problem.

From a policy point of view, the program has raised many useful questions about the effectiveness of education and how it might be improved. Among other things, it has been suggested that the financing of education might be determined on a policy which would be based on assessment levels, giving additional funds to geographic areas where NAEP results show a lag in educational progress. This form of "positive discrimination" has not yet been generally accepted. It is argued by some that it could result in difficulties in allocating federal funds; certainly, it is as yet unknown what positive or negative effects such a policy approach might have.

The program makes it possible to identify gaps in knowledge so that curriculum development, teacher training and educational materials can be improved. The more precise formulation of objectives and sub-objectives in considerable detail also helps in such improvements. The test instruments created help in suggesting new teaching methods.

Since the project included an adult group, a variety of questions arise out of the comparative data, such as: To what degree has there been loss of skill through lack of practice? Have there been improvements in school programs since the adults received their formal education?

The major opportunity is to select from among the many variables those which will serve to measure learning levels. An important part of this project experience was the realization that more than cognitive learning creates an effective individual in society.

The NAEP measures were basically those of the "quality" of educational output. It is not a purely "quantity" measure as many efforts in the past have been, nor is it just the usual achievement testing, and it does not provide scores for persons, and then aggregate them. This is not even possible, since no individual completes all the packages (or exercises).

The project is a clear attempt to determine what it is that is important to know, in order to assess what it is that is known.

Of importance to education, are the methodological solutions and problems which the program has uncovered. It has marshalled a large amount of quantifiable data, which can help provide more valid educational indicators within the social indicator context. The application of assessments to the education of persons may lead to improved indicators of other aspects of social life.

References

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2. Mason, Ward S. Problems of Measurement and the N.I.E. Program. (mimeo.) National Institute of Education, Washington, August 6, 1973.

3. Womer, Frank B. What is National Assessment? NAEP, 1970.

4. National Assessment of Educational Progress, Questions and Answers. NAEP, July 1973.

5. Larson, Robert C., et al. National Assessment of Educational Progress: An Educational Indicator. Paper presented to the Social Statistics Section, American Statistical Association, proceedings, 1972.

6. Correspondence with Dr. J. Stanley Ahman, Staff Director, NAEP, dated November 30, 1973.

7. Correspondence with Wayne H. Martin, Research and Analysis Department, NAEP, dated March 25, 1975.

NOTE: The official reports of NAEP are too numerous to list in this document. A wide variety of reports are available on the overall project, on the development of objectives in the various subject areas, and on the exercises and results of initially administered subject areas: science, citizenship, writing, literature and reading. For NAEP Publications, the address is:

Official Reports
National Assessment of Educational Progress
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402.

Chapter V

Just as the state-of-the-art of work on social indicators is in a pioneering and experimental stage, so too is the work on educational indicators. However, with the exception of health, work on educational indicators appears to be as advanced as any of the sectorial endeavors.

A very high proportion of the work undertaken to date on educational indicators has been focussed on the formal educational enterprise, in the "preparation for life" context. It therefore focusses primarily on youth education. Consideration of nonformal and informal education has been extremely limited, therefore there has been little emphasis on education for adults.

In formal education, we already have a wide variety of sources from which educational indicators may be derived. Sources involving nonformal and informal education need to be recognized where they now exist and developed where they do not exist. The sources include particularly the current and futuristic literature, the current dimensions of policies and programs (public and private), and teacher, learner, leader and citizen views (derived through Delphi or conference techniques). To date, the emphasis has been on the more readily available indicators. Thus "input" indicators represent most of those developed. "Process" indicators rank second, and "output or result" indicators have received minimal attention.

Indicator work associated with the formal educational system offers the best (though inadequate) current model for the initial consideration of education for socioeconomic development. There has been very little work undertaken on the measurement of learning for socioeconomic development*; rather measurement has been on education for economic development in the context of "economic growth." The basis for the rapid expansion in the educational enterprise has been that education has become the instrument for social selection in meeting economic growth needs.

Social and educational indicators could improve the planning of programs associated with education and learning for socioeconomic development. There are two basic reasons for this: first, indicators could provide more objective information to policy-makers and programmers, and second, leaders and citizens could become more knowledgeable through direct experience with the development and use of social and educational indicators.

In industrial and post-industrial societies, measures of the levels of education through schooling have decreasing meaning for development planning. If educational planning becomes concerned with balanced social and economic development, it will be less important as an instrument of social selection and of economic development alone. Education in the "lifelong" context will increasingly become the basis of balanced socioeconomic development, as well an important influence in determining our quality of life.

In dealing with regional disparity in development, we must become more concerned with the distribution of knowledge and widening gap between the educationally advantaged and disadvantaged populations. We need to recognize more explicitly through policies and programs that learning by disadvantaged children can be greatly influenced by the nature and extent of parent education. These concerns call for some greater attention to policies offering "positive discrimination" during developmental periods and for substantially greater commitment to education at preschool and adult levels. Effective educational indicators could make us more sensitive to these needs.

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* A project of current interest is one undertaken by the Economic Council of Canada, designed to determine important factors influencing cognitive and effective skills. For example, its studies in the schools of Ontario and Quebec, using the "path model" approach which indicates both direct and indirect effects on learning, have shown that there is a strong peer group effect in the school system. This finding is supported by a conclusion of the Bureau of School Programs Evaluation, the University of the State of New York (see Chapter III of this monograph). Peer group effect is a policy-controllable factor which can be influenced by modifying classroom composition. It is also the kind of variable which can readily be overlooked in the policy orientation of system administration.

In the initial stages of measuring education for socioeconomic development, it would appear that emphasis should be placed on the development of a limited set of educational indicators relating to each policy dimension, rather than on an integrated system of indicators (matrix) or on a master set of indicators (index).

Since education is associated with almost all areas of social concern, it is useful in developing educational indicators to consider their relationship to social indicators more generally. A study of educational indicators alone would, with the present data base, tend to focus on the educational enterprise, thus limiting the focus of education for the broader development of society. As implied above, the goals of education are so entwined with the goals of socioeconomic development that improvement in educational indicators depends initially on the clarification of the goals of development. In this context, educational indicators are needed not only to measure education itself but to measure the educational impact on other areas of social concern, such as environment, housing and health. New models for lifelong education are urgently needed which would recognize these fundamental interrelationships.

Education cannot be reduced to schooling alone, i.e., to the number of years and levels passed in the formal system. Socioeconomic development demands that we evolve practical measures that will take into account the capacity of people for critical and constructive dialogue, and for understanding the physical and human environment, so that they can engage in the development process in a way meaningful to them and useful to society.

Appendix I

The International Standard Classification of Education (ISCED)*

Official statistics have become an important feature of modern life. The increasing complexity of economic and social institutions and of their interactions in industrial societies has brought a rapid growth in the demand for statistics as a factual basis for decision-making in most fields of human activity. In developing economies seeking a sound basis for development plans, statistics have come to be an essential tool.

The central role of education in the economic and social programs of countries at all levels of development need not be examined here. It is sufficient to note the very rapid growth of educational activity throughout the world during the past quarter century, whether measured in terms of enrollment, employment, or expenditure. Rapid expansion on such a scale is likely to be of uneven quality even within a country unless its direction and thrust are guided by a careful choice of objectives and of the most effective means for attaining them. Furthermore, the programs chosen must be evaluated periodically in terms of their effectiveness in attaining the desired objectives. Statistical data of all kinds play an essential role in the design, control and evaluation of such programs.

Statistics can be used most effectively if they are based upon standard terminology, concepts, definitions, methods of tabulation, and classification. Such standards should be applied as widely as possible to ensure maximum comparability not only in data obtained from different sources on the same or closely related events, but in data obtained from the same sources at different times. Much has been done both nationally and internationally to improve the comparability of statistics relating to population, trade, industrial activity, agriculture, labor, health, education, telecommunications, transport, and many other fields. (1) Of particular interest here is the group of more or less related international standard classifications that have been developed since 1948. These comprise the International Standard Industrial Classification (2), most recently revised in 1968, designed as a standard classification, by industry, of establishments in all branches of economic activity; the Standard International Trade Classification (3), now under revision, which constitutes a standard commodity classification for imports and exports; and the International Standard Classification of Occupations (4), most recently revised in 1968, providing a standard classification of occupations for use in statistics of the labor force as well as in the operation of manpower programs such as: immigration, employment placement, vocational guidance and vocational training. The latest addition to this battery of statistical standard classification systems is the International Standard Classification of Education (ISCED) now being developed by UNESCO.

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*Reference: UNESCO, "A Provisional Guide to the Use of the International Standard Classification of Education, SCED 11, Paris, September 1972, p. 1.

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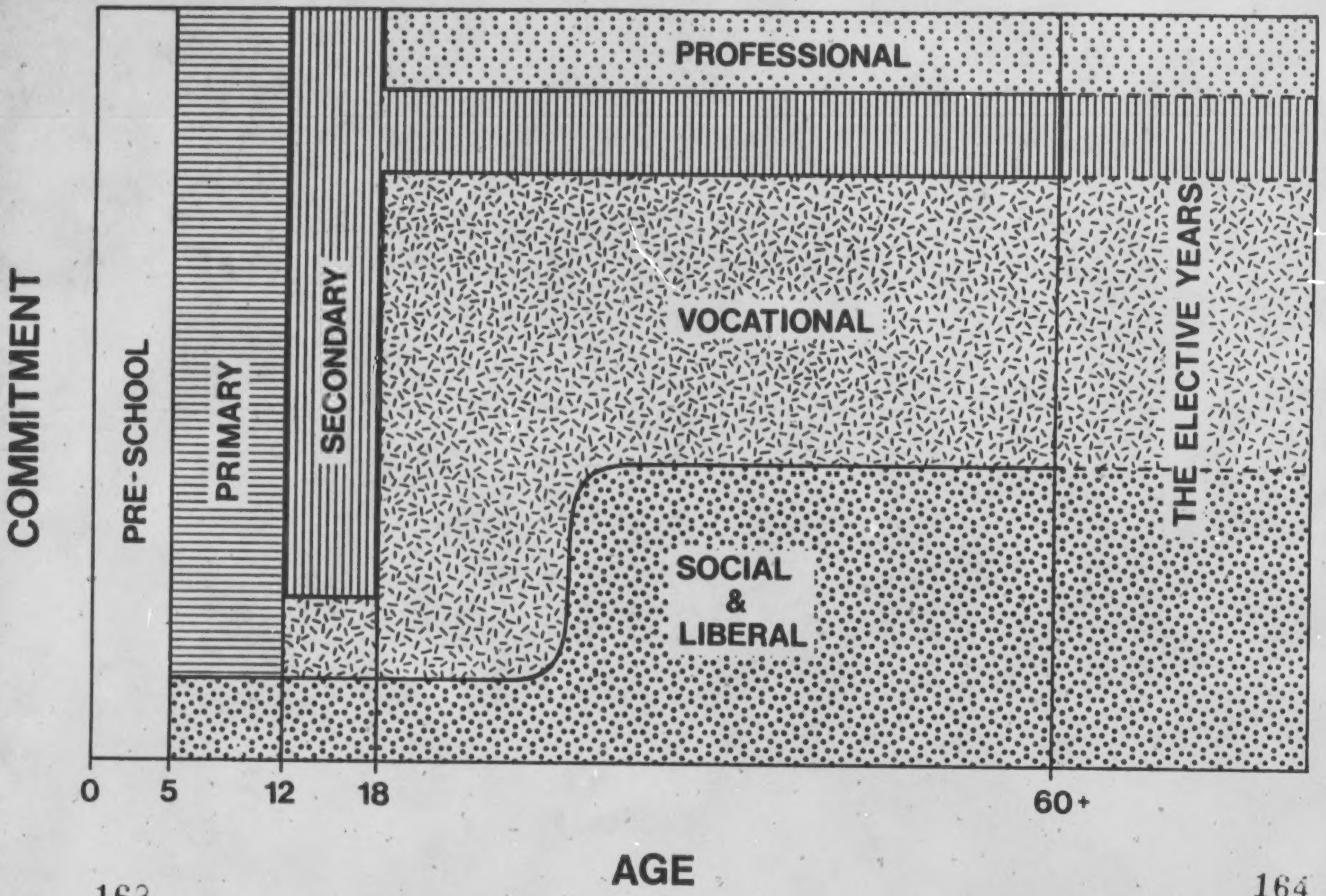
(1) For a summary of international standards see: United Nations, Directory of International Standards for Statistics, New York, 1960 (Statistical Papers Series M No 22, Rev.1.).

(2) United Nations, International Standard Industrial Classification of all Economic Activities, New York, 1966 (Statistical Papers Series M No 4, Rev. 2.).

(3) United Nations, Standard International Trade Classification, New York 1950 (Statistical Papers Series M No Rev. 1.) This is the latest edition available at the time of writing.

(4) International Labour Office, International Standard Classification of Occupations, Revised edition. Geneva, 1968.

APPENDIX II: A Conceptualization of Lifelong Education, Illustrating System Options Needed for Commitment at Varying Ages.


COMMITMENT
PRE-SCHOOL
PRIMARY
SECONDARY
PROFESSIONAL
VOCATIONAL
SOCIAL & LIBERAL
THE ELECTIVE YEARS
0
5
12
18
60+
AGE

Some System Options in Lifelong Education

1. Pre-school education, it is assumed, would take place in the home, the neighborhood, and for some, in day-care centers and early kindergarten schools.
2. Primary education, (K-8) would offer opportunity for a certain amount of community learning (social and liberal) in addition to basic educational courses. Social and liberal education would include an extension of the school classroom into the community, e.g. field-trips, and the use of community adults as resource persons in the classroom.
3. Secondary education, usually involving ages 12-18 years, would continue opportunities for "social and liberal" education as in primary education. It would introduce various types of vocational education in the classroom and through co-operative employment arrangements within the community. Adult basic education programs would make secondary level education available throughout life, by means appropriate to adult students.
4. Professional education, viewed as a post-secondary activity, should be available throughout life to anyone capable of meeting the various tests of competence.
5. Vocational education, viewed as opportunity to gain technical skills, would be accessible throughout life following primary school.
6. Social and liberal education would be available throughout life, following the pre-school period.

7. The elective years, viewed as that period of potential "retirement" when persons are relatively more free to choose alternate roles, would be enriched by open access to any form of education offered in the community.

Appendix III

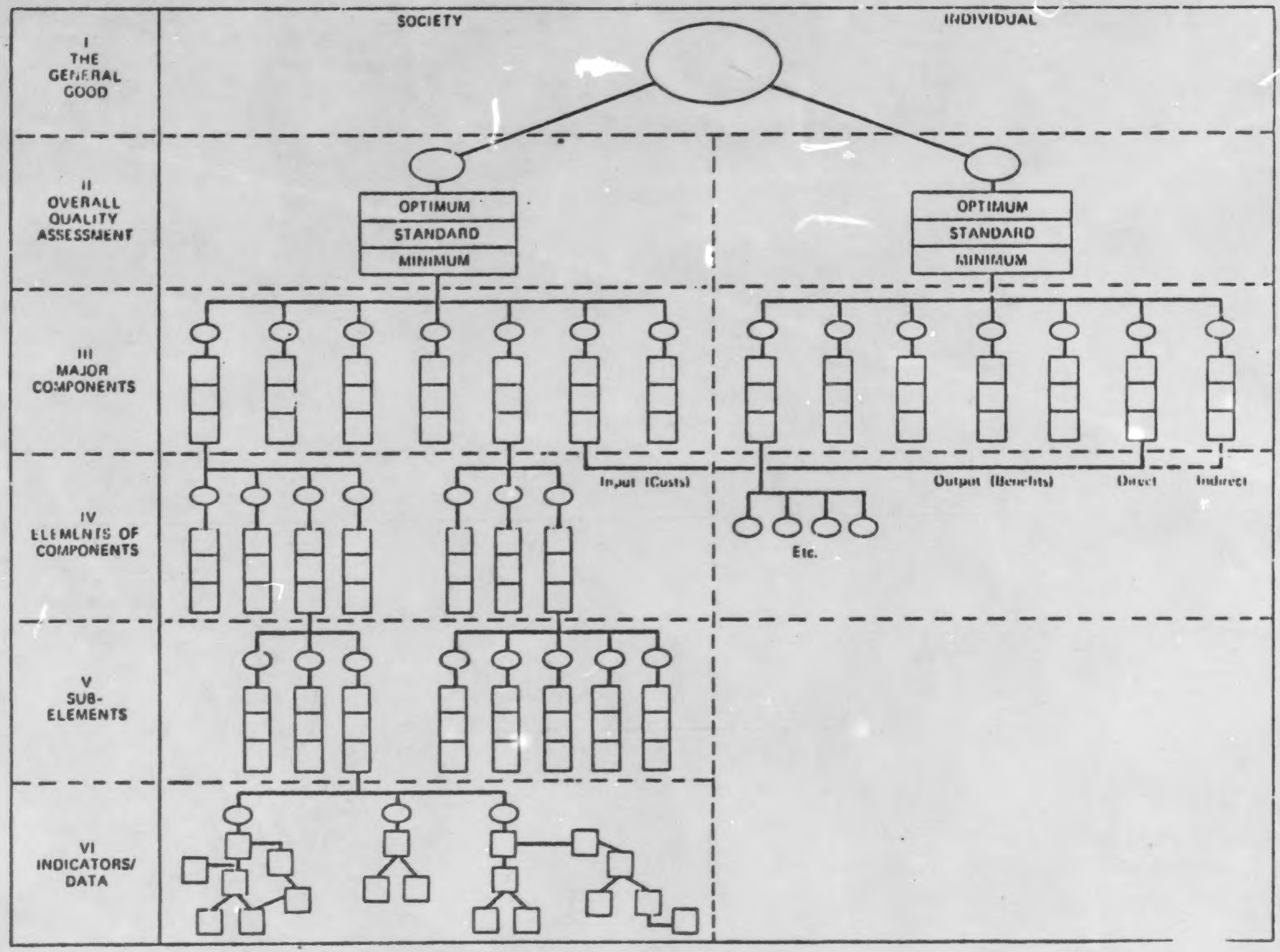
Olkinuora, Erkki, and Hauri Perkki, "The Theoretical Foundations of a System of Educational Indicators and Possibilities for its Practical Construction". Institute for Educational Research, University of Jyväskylä, Finland, 1974, p. XII. (English summary).

Schematic outline of the frame of reference for educational indicators

Quantitative aspects	Educational equality	Relevance from the point of view of production needs	Relevance from the point of view of individual needs and resources	Educational efficiency (and costs)
(input) Structure of educational services	1) The regional equality of the distribution of student places	2) The relevance of the distribution of student places with regard to production (cf. manpower method)	3) The correspondence between supply and demand (cf. social demand method)	4) Financial costs per new student place according to field and level of education (cf. investment in education method)
Flow of students	5) Selection for existing students places according to social status, region and sex (the role of social, regional and sex background in it)	6) The correspondence between the distribution of education of those annually entering employment and the manpower needs of production.	7) Possibility to choose the kind of further education one is interested in after compulsory education.	8) Difference between actual flows and the greatest potential flow. Costs per each educated person.
(output) Educational stocks	9) The regional, social and male-female equality in the distribution of schooling in the entire population	10) The adequacy of the educational stock of the entire population from the point of view of production needs.	11) The proportions of those in different groups of the population who have received the education they would have wanted to.	12) The proportion of those having received goal-level education of the entire population ('how many how far in schooling'), Costs per stock or its part.
Qualitative aspects				
(input) Nature and content of education	13) Fairness of treatment and marking (elimination of halo effect). Measures towards equalization of differences in achievement and motivation. Representativeness of value and attitude contents from the point of view of subcultures of social classes	14) Relevance of teaching contents from the point of view of the needs of production and of scientific-technological development. Relevance of working methods in education from the point of view of the needs of working life.	15) Relevance of teaching contents and methods from the point of view of the individual's development and resources (e.g. promoting creativity, activeness, critical attitude)	16) Organization and resources of teaching (quality and quantity of material and human resources, differentiation of teaching)
(output) Educational achievements	17) Social, regional and male-female equality in performances and achievements.	18) Relevance of actually produced knowledge and skill stocks from the point of view of production and working life	19) Relevance of the learning acquired from the point of view of individual development and resources.	20) Amount of the learning acquired per unit of time i.e. difference between the initial and final situations. ('How many how far in education achievements')

Appendix IV

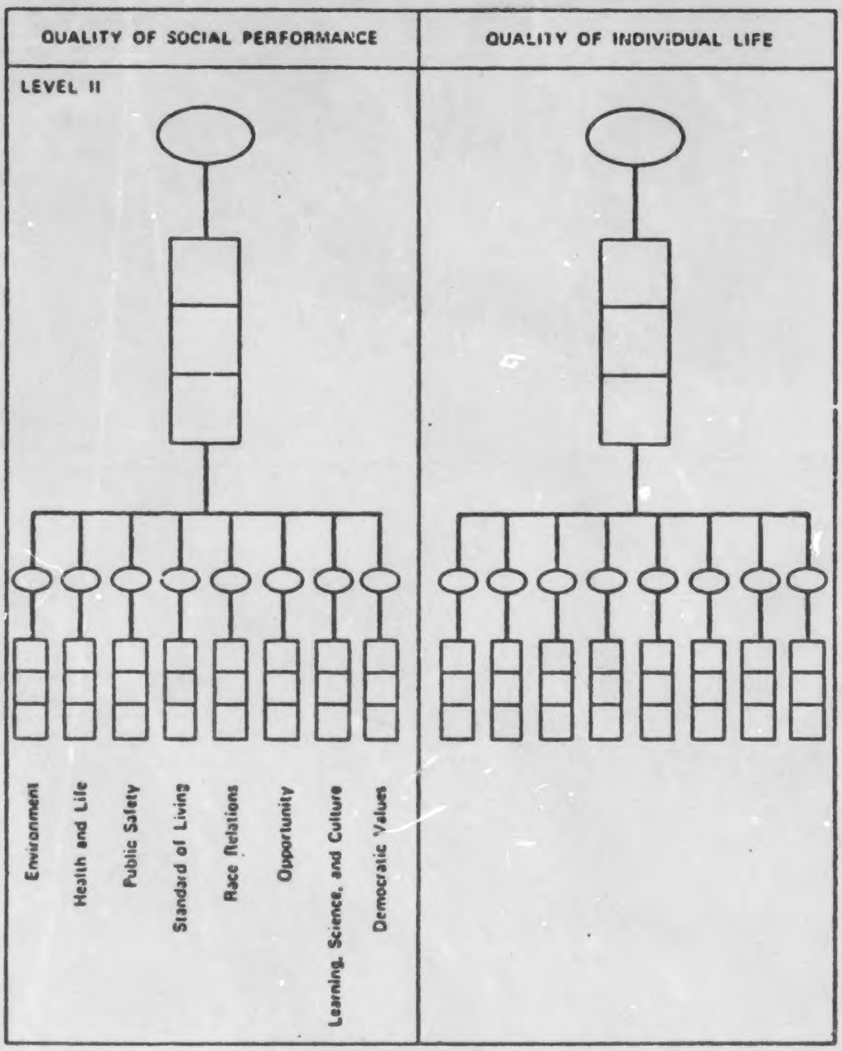
Basic Heuristic Schema


SOCIETY
INDIVIDUAL
I THE GENERAL GOOD
II OVERALL QUALITY ASSESSMENT
OPTIMUM
STANDARD
MINIMUM
OPTIMUM
STANDARD
MINIMUM
III MAJOR COMPONENTS
Input (Costs)
Output (Benefits)
Direct
Indirect
IV ELEMENTS OF COMPONENTS
Etc.
V SUB-ELEMENTS
VI INDICATORS/ DATA

Reference: "Toward Master Social Indicators," p. 5, Stanford Research Institute

Appendix V

Major Indicator Areas

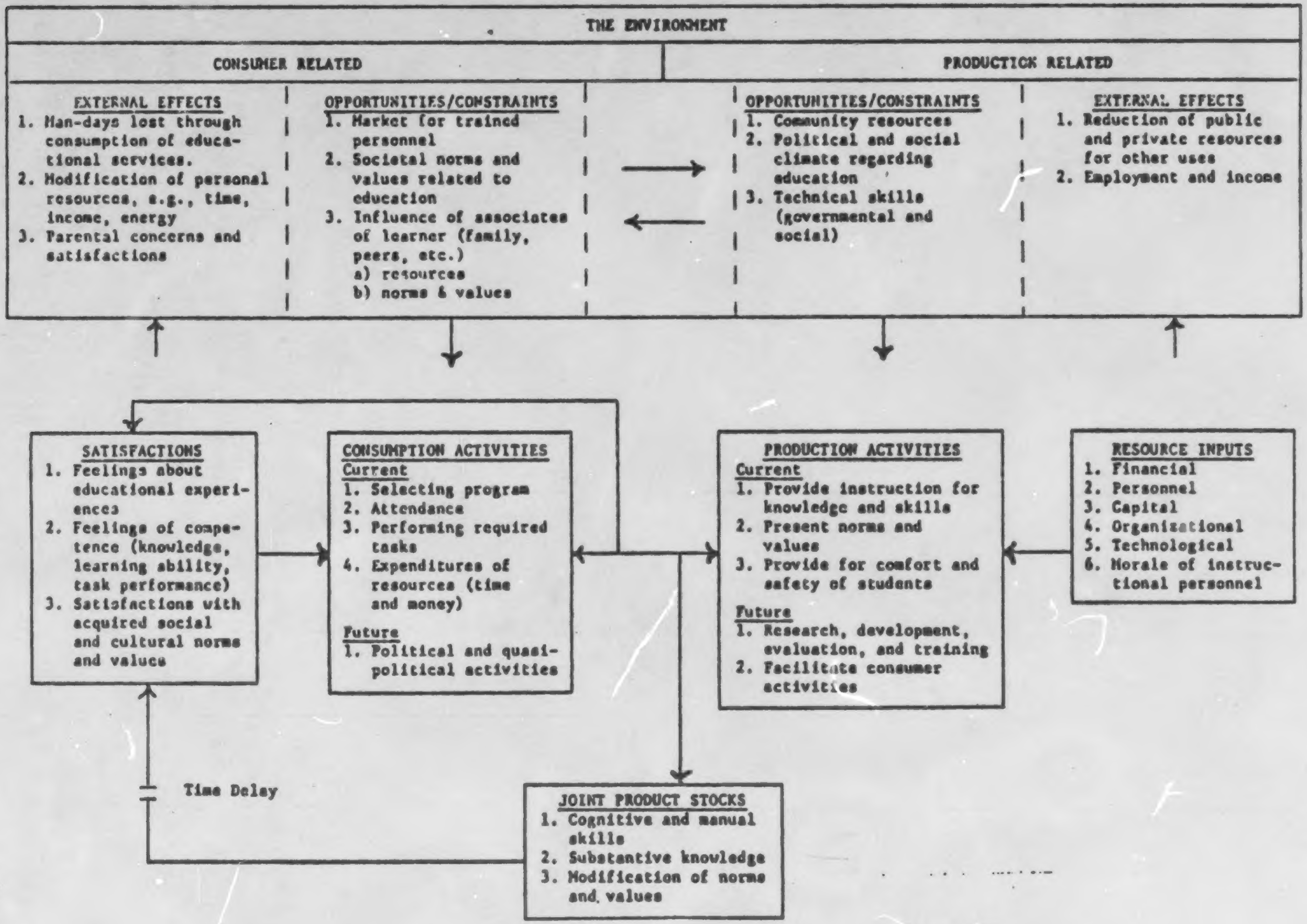

QUALITY OF SOCIAL PERFORMANCE
QUALITY OF INDIVIDUAL LIFE
LEVEL II
Environment
Health and Life
Public Safety
Standard of Living
Race Relations
Opportunity
Learning, Science, and Culture
Democratic Values

* Examples are chapters in the *Social Report* now in preparation by a HEW panel, under the direction of Mancur Olson, Jr.

Reference: "Toward Master Social Indicators," p. 9, Stanford Research Institute.

Appendix VI

Model for "Learning and Education"


THE ENVIRONMENT
CONSUMER RELATED
PRODUCTION RELATED
EXTERNAL EFFECTS
1. Man-days lost through consumption of educational services.
2. Modification of personal resources, e.g., time, income, energy
3. Parental concerns and satisfactions
OPPORTUNITIES/CONSTRAINTS
1. Market for trained personnel
2. Societal norms and values related to education
3. Influence of associates of learner (family, peers, etc.)
a) resources
b) norms & values
OPPORTUNITIES/CONSTRAINTS
1. Community resources
2. Political and social climate regarding education
3. Technical skills (governmental and social)
EXTERNAL EFFECTS
1. Reduction of public and private resources for other uses
2. Employment and income
SATISFACTIONS
1. Feelings about educational experiences
2. Feelings of competence (knowledge, learning ability, task performance)
3. Satisfactions with acquired social and cultural norms and values
CONSUMPTION ACTIVITIES
Current
1. Selecting program
2. Attendance
3. Performing required tasks
4. Expenditures of resources (time and money)
Future
1. Political and quasi-political activities
PRODUCTION ACTIVITIES
Current
1. Provide instruction for knowledge and skills
2. Present norms and values
3. Provide for comfort and safety of students
Future
1. Research, development, evaluation, and training
2. Facilitate consumer activities
RESOURCE INPUTS
1. Financial
2. Personnel
3. Capital
4. Organizational
5. Technological
6. Morale of instructional personnel
Time Delay
JOINT PRODUCT STOCKS
1. Cognitive and manual skills
2. Substantive knowledge
3. Modification of norms and values

Reference: Social Indicator Models for Urban Policy - Five Specific Applications, p. 62, The Urban Institute.

Appendix VII ILLUSTRATIVE EXAMPLES OF SOCIAL (EDUCATIONAL) INDICATORS FOR DIFFERENT TYPES OF COUNTRIES*

A least-developed country[a]	A developing country[b]	A developed country
III. Learning and the educational services		
A. Educational attainments of the population		
1. Percentage of literates (infrequently): Male, female Ages 15-24, 25 and over Urban, rural and total	Percentage of literates (infrequently): Male, female Ages 15-24, 25 and over Urban, rural and total Geographical areas	
2. Median years of schooling completed (infrequently): Male, female Ages 15-24, 25 and over Urban, rural and total	Median years of schooling completed (infrequently) Male, female Ages 15-24, 25 and over Urban, rural and total Selected national or ethnic groups Geographical areas	Median years of schooling completed (infrequently): Male, female Ages 25-29, 30 and over Urban, rural and total Selected national or ethnic groups Geographical areas
3. Proportion who have completed schooling (infrequently): First level, second level Male, female Ages 15-24, 25 and over Urban, rural and total	Proportion who have completed schooling (infrequently): First level, second level, third level Ages 15-24, 25 and over Urban, rural and total Geographical areas	Proportion who have completed schooling (infrequently): Second level, third level Ages 25-29, 30 and over Urban, rural and total Geographical areas
B. Use and distribution of educational services		
1. Proportion of population enrolled full-time (annually or annual estimates): Male, female Ages 5-9, 10-14, 15-19 Urban, rural and total	Proportion of population enrolled full-time (annually or annual estimates) Male, female Ages 5-9, 10-14, 15-19, 20-24 Urban, rural and total	Proportion of population enrolled full-time (annually or annual estimates): Male, female Ages-5-9, 10-14, 15-19, 20-24, 25-29 Urban, rural and total

*Drawn from the Draft Guidelines on Social Indicators, the Nineteenth Session of the Statistical Commission, United Nations Economic and Social Council, New Delhi, India, 8-19 November, 1976. Annex IV, pp. 6-9.

A least-developed country[a]	A developing country[b]	A developed country
	III. Learning and the educational services (continued)	
B. Use and distribution of educational services (continued)		
2.	Proportions of population enrolled part-time (infrequently): Male, female Urban, rural and total Ages 10-19, 20-29, 30+	Proportions of population enrolled part-time (infrequently): Male, female Urban, rural and total Ages 10-19, 20-29, 30+
C. Educational achievement		
1.	Rate of change in test scores (infrequently): Selected ages and subjects Urban, rural and total	Rate of change in test scores (infrequently): Selected ages and subjects Urban, rural and total Geographical areas Selected national or ethnic groups
D. Inputs, outputs and performance of educational services		
1. Ratio of students per teacher (annually): Urban, rural and total First level, second level	Ratio of students per teacher (annually): Urban, rural and total First level, second level	Ratio of students per teacher (annually): Urban, rural and total First level, second level, third level (national only)
2. Median level completed by teachers (infrequently): Urban, rural and total First level, second level	Median level completed by teachers (infrequently): Urban, rural and total First level, second level	Median level completed by teachers (infrequently): Urban, rural and total First level, second level, third level (national only)

A least-developed country[a]	A developing country[b]	A developed country
III. Learning and the educational services (continued)		
D. Inputs, outputs and performance of educational services (continued)		
3. Total consumption expenditures on education per full-time enrollee (annually or less frequently): First level (urban, rural) Second level	Total consumption expenditures on education per full-time enrollee (annually): First level (urban, rural) Second level Third level	Total consumption expenditures on education per full-time enrollee (annually): First level (urban, rural) Second level Third level
4. Total consumption expenditures on education as a percentage of GDP (annually or less frequently)	Total consumption expenditures on education as a percentage of GDP (annually)	Total consumption expenditures on education as a percentage of GDP (annually)
5. Gross fixed capital formation in education as a percentage of total gross fixed capital formation (annually or less frequently)	Gross fixed capital formation in education as a percentage of total gross fixed capital formation (annually): First level (urban, rural) Second level Third level	Gross fixed capital formation in education as a percentage of total gross fixed capital formation (annually): First level (urban, rural) Second level Third level

A least-developed country[a]	A developing country[b]	A developed country
III. Learning and the educational services (continued)		
D. Inputs, outputs and performance of educational services (continued)		
6.	Unrequited current transfers to institutions and households for educational purposes as a percentage of total government outlays for educational purposes (annually or less frequently): First and second levels Third level	Unrequited current transfers to institutions and households for educational purposes as a percentage of total government outlays for educational purposes (annually). First and second levels Third level
7. Proportion of enrollees who successfully complete their year (annually or less frequently): Urban, rural and total First level only	Proportion of enrollees who successfully complete their year (annually or less frequently): Urban, rural and total First level, second level	Proportion of enrollees who successfully complete their year (annually or less frequently): Urban, rural and total First level, second level, third level
8.	Expectation of level or grade of attainment at school entrance age (infrequently): Male, female Urban, rural and total Geographical areas	Expectation of level or grade of attainment at school entrance age (infrequently): Male, female Urban, rural and total Geographical areas

Appendix VIII

UNESCO Social Science Department Bibliography on Social Indicators

Progress Report I on the Methodology of Human Resources Indicators. (Unesco/COM(SHC)CS/194/5).

Study II. An Analytical Approach to Educational Attainment Indicators based on the Analysis of School Enrollment by Grade.

Study III. Procedure of Evaluating High-level Manpower Data and Typology of Countries by means of the Taxonomic Method, by Z. Hellwig.

Study IV. On the Definition and Theory of Development with a View to the Application of Rank Order Indicators in the Elaboration of a Composite Index of Human Resources (Paper prepared for the Unesco Expert Meeting on the Methodology of Human Resources Indicators, held in Warsaw 11-16 December 1967). The paper can also be identified as PRIO-publication no. 6-4 from the International Peace Research Institute, Oslo, by Johan Galtung and Tord Hoivik.

Study V. Discussion of methodological guidelines, problem areas and difficulties connected with the elaboration of coherent systems of indices of human resources, by Z. Gostkowski.

Study VI. On the Optimal Choice of Predictors, by Z. Hellwig.

Study VII. On the problem of Weighting in International Comparisons, by Z. Hellwig.

Study VIII. Indices of Development for Selected Latin American and Middle African Countries. An Experimental Exercise using the Hellwig Taxonomic Method, by Frederick H. Harbison, Joan Maruhnic, Jane R. Resnick.

Study IX. Alternative Combinations of Human Resources Components as Predictors of Economic Growth in Latin America, by the Higher School of Economics, Wroclaw, Poland.

Study X. Concerning Data Availability and Conceptual Validity, Selected Latin American and African Countries, by Frederick H. Harbison, Joan Maruhnic, and Jane R. Resnick.

Study XI. The Assessment of the Validity of Human Resources Indicators by means of a Cobb-Douglas Type Production Function, by H.V. Muhsam, Hebrew University, Jerusalem, Israel.

Study XII. The Use of Taxonomic Measures in Target Setting Based on International Comparisons, by Z. Gostkowski.

Study XIII. Human Resources and Economic Growth: The Case of Mexico, by Tord Hoivik, International Peace Research Institute, Oslo.

Study XIV. Human Resources and Socio-Economic Development:
I. Theory, Methods and Data II. The Case of Japan, by Johan Galtung.

Study XV. Human Resources and Socio-Economic Development: The Case of Venezuela, by Kristin Tornes, International Peace Research Institute, Oslo.

Study XVI. Approximative Methods of Selection of an Optimal Set of Predictors, by Z. Hellwig.

Study XVII. Mathematical Methods in the Unesco Project on Human Resources Indicators:
i) An evaluation
ii) Alternative Analytical Methods.
by Ludovic Lebart (SHC/WS/219).

Study XVIII. Human Resources and Economic Development. Some problems of Measurement by Prof. Wilfred Beckerman (University College, London).

Study XIX. Distance-based Analysis, Numerical Taxonomy and classification of countries according to selected areas of socio-economic development, by Fanchette, Methods and Analysis Division, Unesco.

Study XX. Diachronic Analysis of Relationships between Human Resources Components and the Rate of Economic Growth in Selected Countries (COM/WS/131) by Johan Galtung.

Study XXI. The Selection of a Set of "Core" Indicators of socio-economic development, by Z. Hellwig and S. Fanchette.

Study XXII. The Quest for an Employment Strategy in Developing Countries and its relationship to the work on Human Resources Indicators, by H.W. Singer (Institute of Development Studies, The University of Sussex, UK).

Study XXIII. "Synchronic and Diachronic Approaches in the Unesco project on Human Resources Indicators. Wroclaw Taxonomy and Bivariate Diachronic Analysis" (SHC/WS/209), by Serge Fanchette - Methods and Analysis Division, Unesco.

Study XXIV. A method of establishing a list of development indicators, by B. Ivanovic (Director of the Office of Statistics of UNCTAD).

Study XXV. Grouping and ranking of 30 countries of Sub-Saharan Africa. Two distance-based methods compared, by B. Ivanovic and Serge Fanchette.

Study XXVI. Aspects of the distribution of income and wealth in Kenya, by H.W. Singer and Stuart D. Reynolds (The Institute of Development Studies, University of Sussex, UK).

Study XXVII. Distributional patterns of development and welfare: A case study of Zambia, by Charles Elliott (Overseas Development Group, School of Development Studies, University of East Anglia).

Study XXVIII. Typological study using the Wroclaw taxonomic method (A study of regional disparities in Venezuela), by Jose F. Silvio-Pomenta (Centro de Estudios del Desarrollo) (CENDES), Universidad Central de Venezuela.

Appendix IX

Agency for International Development Educational Indicators Developed by Iowa State University*

1. Dropout rates across educational institutions.
2. Measures of student alienation expressed as rates.
3. Scores on achievement tests.
4. Number of guidance counsellors per 1,000 students (disaggregatable across differing student classifications).
5. Enrollment rates over time, disaggregatable for groups, per 1,000.
6. Ratio teaching staff to school enrollment.
7. Number of people with at least 5 years of schooling per 1,000.
8. Ratio teachers with advanced degrees.
9. Adult literacy rates (over differing groups).
10. Illiteracy rates among currently enrolled students (over differing groups).
11. Participation rates in adult education activities (across differing programs; across differing groups).
12. Absenteeism/truancy index per 1,000.
13. Highest year of education attained by head of household per 1,000.
14. Student reading achievement scores per 1,000.
15. Percentage of students receiving Bachelor's degrees who were enrolled in degree credit programs (across differing groups).
16. Percentage of students receiving Master's degrees who were enrolled in degree credit programs (across differing groups).
17. Percentage of students receiving Ph.D. degrees who were enrolled in degree credit programs (across differing groups).
18. Percentage high school graduates attending college by educational ability and socioeconomic status.
19. Ratio of number of students attending universities to those attending community college.
20. Percentage of persons 25-29 and 25 and over with 4 years of high school.
21. Percentage of persons 25-29 and 25 and over with less than 5 years of school.
22. Percentage of 18-year-olds graduating from high school.
23. School retention rates from 5th grade on (for selected years).
24. Percentage of persons enrolled in school by age, sex, and race (and by other groups).

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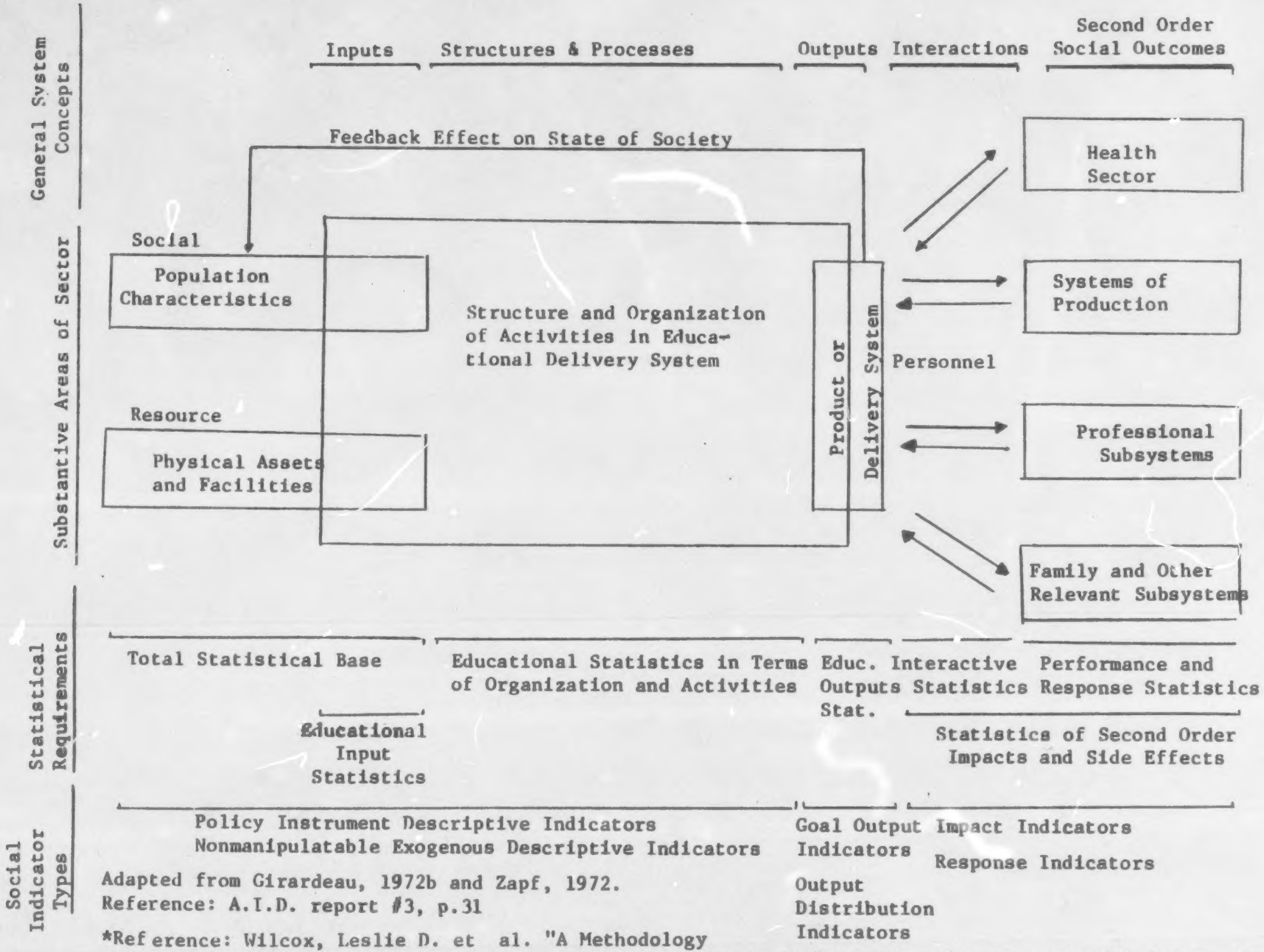
*Reference: Wilcox, Leslie D., et al. "A Methodology for Indicators of Social Development" Report 2: "An Analysis of Selected A.I.D. Operational Indicators and Concepts." Ames, Iowa: Sociology Report No. 116, Sept., 1973, pp. 79-80

25. Number enrolled in elementary and secondary schools, public and private as a percentage of appropriate age range per 1,000.
26. Percentage of teachers possessing teaching certificates.
27. Number of schools with libraries per 1,000 schools.
28. Ratios of high school students in academic, vocational and technical programs (over groups).
29. Average number of persons per room (classroom), per 1,000 schools.
30. Potential earnings of graduates per 1,000 students.
31. Expenditures per pupil.
32. Hours of educational TV as a percentage of all television hours transmitted.
33. The percentage of total school expenditures that are used for instructional purposes (teachers' salaries, etc.) as compared to administration, maintenance and operation, interest on debt.
34. Percentage of qualified population taking advantage of educational opportunities.
35. Current expenditure on research in universities and colleges.
36. Number of college presidents, professors, and instructors per 1,000 population.
37. Number of people in post-graduate education.
38. Daily newspaper circulation per adult population.
39. Radios and TVs per adult population.

Appendix X

Schematic Diagram of Information Needs in Social Development Pertaining to the Educational Sector*


General System Concepts
Inputs
Structures & Processes
Outputs
Interactions
Second Order Social Outcomes
Feedback Effect on State of Society
Substantive Areas of Sector
Social
Population Characteristics
Resource
Physical Assets and Facilities
Structure and Organization of Activities in Educational Delivery System
Product or Delivery System
Personnel
Health Sector
Systems of Production
Professional Subsystems
Family and Other Relevant Subsystems
Statistical Requirements
Total Statistical Base
Educational Input Statistics
Educational Statistics in Terms of Organization and Activities
Educ. Outputs Stat.
Interactive Statistics
Performance and Response Statistics
Statistics of Second Order Impacts and Side Effects
Social Indicator Types
Policy Instrument Descriptive Indicators
Nonmanipulatable Exogenous Descriptive Indicators
Goal Output Indicators
Output Distribution Indicators
Impact Indicators
Response Indicators

Adapted from Girardeau, 1972b and Zapf, 1972.
Reference: A.I.D. report #3, p.31

*Reference: Wilcox, Leslie D. et al. "A Methodology for Indicators of Social Development," Report 3: "Toward an Integrated Social Information System." Ames, Iowa: Sociology Report No. 117, Jan. 1973. p.31

Appendix XI

Members of the International Association for the Evaluation of Educational Achievement (IEA)

Australia	Australian Council for Educational Research, Frederick Street, Box 210 Hawthorn, Victoria 3122
Belgium	Laboratoire de pédagogie expérimentale Université de Liège au Sart Tilman 4000 Liège I
Chile	Universidad de Chile Instituto de Investigaciones Estadisticas J.P. Alessandri 685 Santiago
England	National Foundation for Educational Research in England and Wales The Mere, Upton Park, Slough Bucks. SLI 2DQ
Federal Republic of Germany	Deutsches Institut für Internationale Pädagogische Forschung Schloss-Strasse 29 Postfach 90 02 80 6 Frankfurt-am-Main 90
Finland	Institute for Educational Research University of Jyväskylä, Jyväskylä
France	Institut National d'Etude du Travail et d'Orientation Professionelle 51, rue Gay-Lussac, Paris Ve
Hungary	Országos Pedagógiai Intézet Gorkij fasor 17-21 Budapest VII
India	National Institute of Education Mehrauli Road, New Delhi 16
Iran	Institute for Educational Research and Studies No. 509 Takhtejamshid Ave. P.O. Box 3071, Teheran
Ireland	The Economic and Social Research Institute 4, Burlington Road, Dublin 4
Israel	Ministry of Education and Culture Curriculum Center 4, Mamilla Street, Jerusalem

Italy	IEA, c/o CNITE Via Marche 84 00187 Roma
Japan	National Institute for Educational Research 5-22 Shimomeguro, 6-chome Meguro-ku, Tokyo
Netherlands	Research Institute for Applied Psychology University of Amsterdam Herengracht 510, Amsterdam C1
New Zealand	Curriculum Development Unit Department of Education, Private Bag Government Buildings, Wellington C
Poland	Instytut Pedagogiki Ul. Górczewska 8, Warsaw
Romania	Institutul de Cercetari Pedagogice Str. Sfintii Apostoli 14, Bucharest
Scotland	The Scottish Council for Research in Education 46, Moray Place Edinburgh EHC 6BH
Sweden	Institute for the Study of International Problems in Education Hagagatan 25A, Box 6701 S-113 85 Stockholm
Thailand	Bangkok Institute for Child Study Sukhumvit Soi 23 Bangkok 11
United States	Department of Psychology Teachers College, Columbia University New York N.Y. 10027

Appendix XII

Sample Listing of Variables Used in the International Study of Achievement in Mathematics: A Comparison of Twelve Countries

These variables were drawn drom the Data Bank Manual by Richard M. Wolf, and are cited here only for the purpose of illustrating roughly the nature of the variables used in such a study and the nature of data now stored in the IEA Data Bank at the University of Chicago and available for ongoing work in educational research. The "rough approximation" in wording some variables is required since in the Manual the variables are frequently listed in "scale" form, the detail of which is not considered essential for purposes here.

Part I: Variable Glossary for School Sector

1. Number of full-time teachers
2. Number of staff teaching mathematics
3. Number of staff with specialist training in mathematics
4. Percentage of teachers who are men
5. Sex of students of the school (boys, girls, co-ed together and separate)
6. Type of school (comprehensive, selective-academic, selective-vocational, etc.)
7. Educational differentiation
8. Average number of subjects taken
9. Total annual salary budget in U.S. dollars
10. Annual recurrent equipment expenditure
11. Special opportunities for able students
12. Experimental program
13. Type of program
14. Number of hours instruction per year
15. Age of entry of students
16. Age of terminal students
17. Financial expense per student on teacher's salary
18. Total financial expense per student
19. School variability of father's occupational status
20. Social class level of school
21. National use
22. Description of mathematics teaching
23. Description of school and school learning
24. Description of mathematics teaching and school learning
25. Number of students tested

Part II: Variable Glossary for Teacher Sector

1. Age
2. Sex
3. Length of training
4. Type of professional training
5. Type of subject training (university, teacher training college, etc.)
6. Teacher training certificate
7. Subject matter certificate
8. Years of teaching experience
9. Number weeks of recent in-service training in mathematics
10. Number of lectures/short seminars attended
11. New mathematics in-service training
12. Teaching new mathematics
13. Type of new mathematics training
14. Teacher attitude scale
15. Set syllabus restriction
16. Set textbooks restriction
17. Set methods restriction
18. Examinations restriction
19. Degree freedom given teachers
20. Rating of student opportunity to learn higher mental process items
21. Rating of student opportunity to learn lower mental process items
22. Rating of student opportunity to learn all mathematics items (including new math., basic math., more advanced math., elementary algebra, intermediate algebra, intuitive geometry, demonstrative geometry, analytic geometry, calculus, analysis, sets, logic, verbal, computational)

Part III: Variable Glossary for Student Sector

1. Grade in school
2. Sex
3. Age
4. School/course/program (academic, vocational, general)
5. Type of mathematics teacher
6. Number of students in class
7. Periods/lessons in mathematics per week
8. Number of hours of mathematics per week
9. Hours of schooling per week

10. Number of hours of mathematics homework per week
11. Number of hours of all homework per week
12. Place of parents' residence (rural-farm, village, etc.)
13. Father's education (number of completed years)
14. Mother's education (number of completed years)
15. Status of father's occupation (per occupational code)
16. Father's occupation (scientific vs. nonscientific)
17. Mother's employment (none, full-time, part-time)
18. Years of additional full-time education expected
19. Years of additional full-time education desired
20. Expected occupation (scientific vs. nonscientific)
21. Status of expected occupation (per occupational code)
22. Status of desired occupation (per occupational code)
23. Desired occupation (scientific vs. nonscientific)
24. Expectations to take more mathematics
25. Wishes to take more mathematics
26. Extra activities in mathematics
27. Description of extra activities in mathematics
28. Level of mathematics instruction
29. Highest number of mathematics courses taken
31. Experimental mathematics course
32. Further education or employment (university, institute of higher education, etc.)
33. Examination taken or planned
34. Best-liked subjects
35. Best subject
36. Worst subject
37. Contents of mathematics courses
38. Verbal tests
39. Creativity test
40. Interest in mathematics
42. Number of hours devoted to school work per week
43. Total mathematics test score
44. Lower mental process score
45. Higher mental process score
46. Verbal mathematics score
47. Computational mathematics score, student performance in --

48. New Mathematics, basic arithmetic, more advanced arithmetic, elementary algebra, intermediate algebra, all algebra, intuitive geometry, demonstrative geometry, all geometry, analytic geometry, calculus, analysis, sets, logic
49. Views about mathematics teaching
50. Views about school and school learning
51. Attitudes toward mathematics as a process
52. Attitudes toward difficulties in learning mathematics
53. Attitudes toward the place of mathematics in society
54. Attitudes toward school and school learning
55. Attitudes toward man and environment
56. Description of mathematics teaching and school learning
57. Student response to mathematics
58. Student response to opinionnaire (comprising 65 items in two description and five attitude scale scores)

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